PROJECT:

TANK REPLACEMENT AT HALEY ROAD

RFP #15-001-23

SHELBY COUNTY GOVERNMENT

6411 HALEY ROAD

MEMPHIS, TN

Hertter Mechanical Services

SCOPE OF WORK

1. REPLACE 4 FUEL TANKS WITH DOUBLE WALL FIBERGLASS UNDERGROUND STORAGE TANKS.
2. REPLACE (8) FUEL DISPENSERS.
3. REPLACE EXISTING FUEL LINES WITH NEW DOUBLE WALL FRP PIPING AND MANIFOLD VAULTS.
4. TIE BACK TO AND UPGRADE EXISTING VEETER ROOT SYSTEM.
5. INSTALL NEW LEAK DETECTION SYSTEM AND ALARMS.

ADD ALTERNATES:

1. INSTALL LP FUEL DISPENSER FROM EXISTING TANK.
2. INSTALL SECURITY CAMERAS.
3, REPLACE CANOPY LIGHTS WITH LED FIXTURES.

NOTES:

1. ALL NEW UNDERGROUND PIPING AND WIRING SHALL BE ROUTED IN THE TRENCHES.
2. ALL MATERIAL AND INSTALLATION SHALL BE IN ACCORDANCE WITH NFPA 30 – FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE, NFPA 30 – MOTOR FUEL DISPENSING FACILITIES AND REPAIR GARAGE CODE, NFPA 31 – INSTALLATION OF OIL BURNING EQUIPMENT STANDARD.
3. INSTALL UNDERGROUND FUEL–OIL PIPING BURIED AT LEAST 18 INCHES BELOW FINISHED GRADE.
4. INSTALL DOUBLE CONTAINMENT, FUEL OIL PIPING AT A MINIMUM SLOPE OF 2% DOWNWARD TOWARDS FUEL–OIL STORAGE TANK SUMP.
5. INSTALL VENT PIPE AT A MINIMUM SLOPE OF 2% DOWNWARD TOWARDS FUEL–OIL STORAGE TANK SUMP.
6. ALL ELECTRICAL WORK SHALL CONFORM TO NFPA 70, ARTICLE 500 HAZARDOUS (CLASSIFIED) LOCATIONS AND MEMPHIS AND SHELBY COUNTY ELECTRICAL CODE.
7. CONTRACTOR SHALL BE A "UST APPROVED CORRECTIVE ACTION CONTRACTOR."

DRAWING INDEX

CONSULTANTS

MECHANICAL ENGINEER – HERTTER MECHANICAL SERVICES
4700 WILD FERN DR, BARTLETT, TN 38135
(901) 827–8016

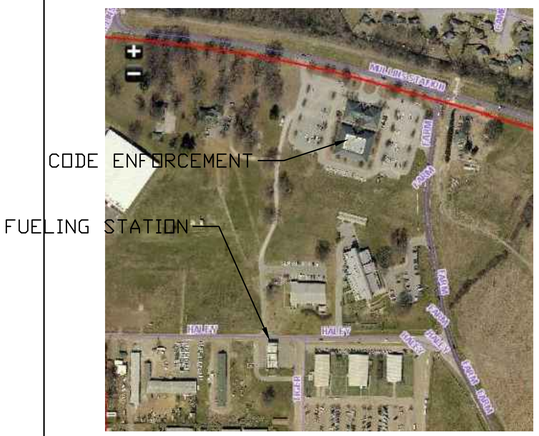
CODE NOTES

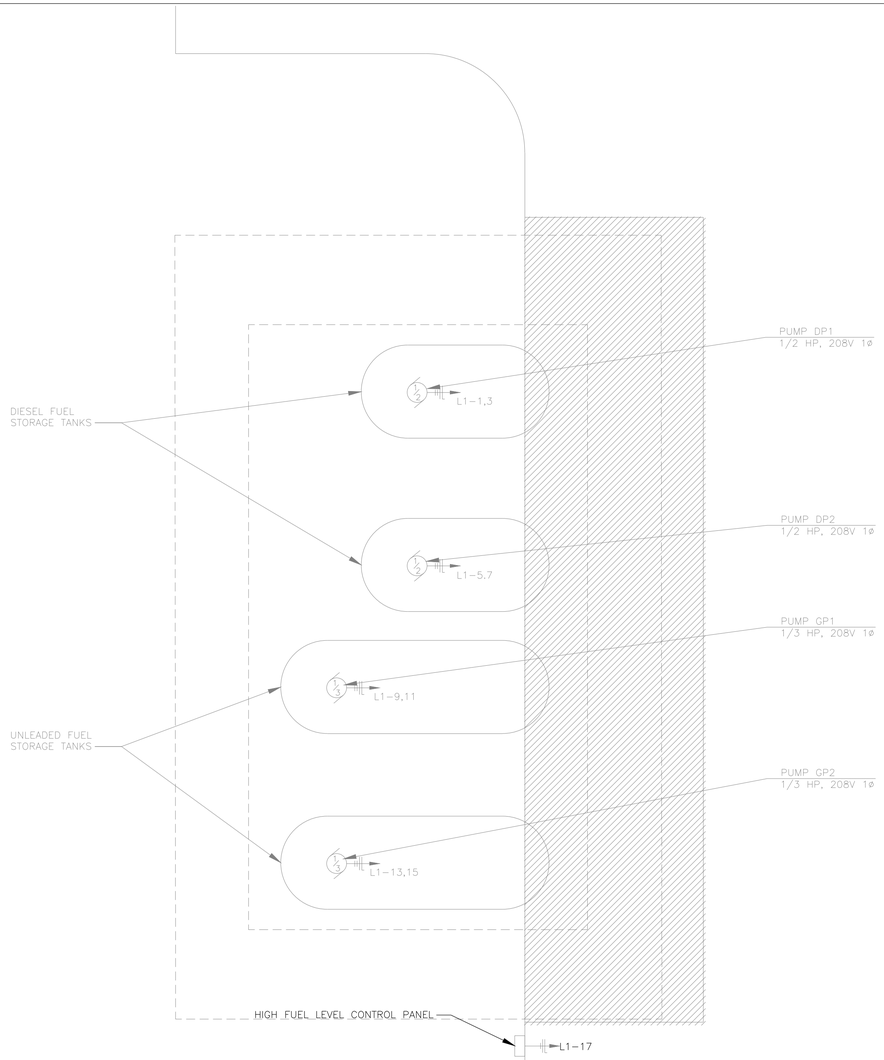
2009 INTERNATIONAL BUILDING CODE W/ LOCAL AMENDMENTS
2012 INTERNATIONAL EXISTING BUILDING CODE W/ LOCAL AMENDMENTS
2008 NATIONAL ELECTRIC CODE W/ LOCAL AMENDMENTS
2009 INTERNATIONAL MECHANICAL CODE W/ LOCAL AMENDMENTS
2009 INTERNATIONAL GAS CODE W/ LOCAL AMENDMENTS
2009 INTERNATIONAL PLUMBING CODE W/ LOCAL AMENDMENTS
2009 INTERNATIONAL EXISTING BUILDING CODE W/ LOCAL AMENDMENTS
ASHRAE 62 – 2007

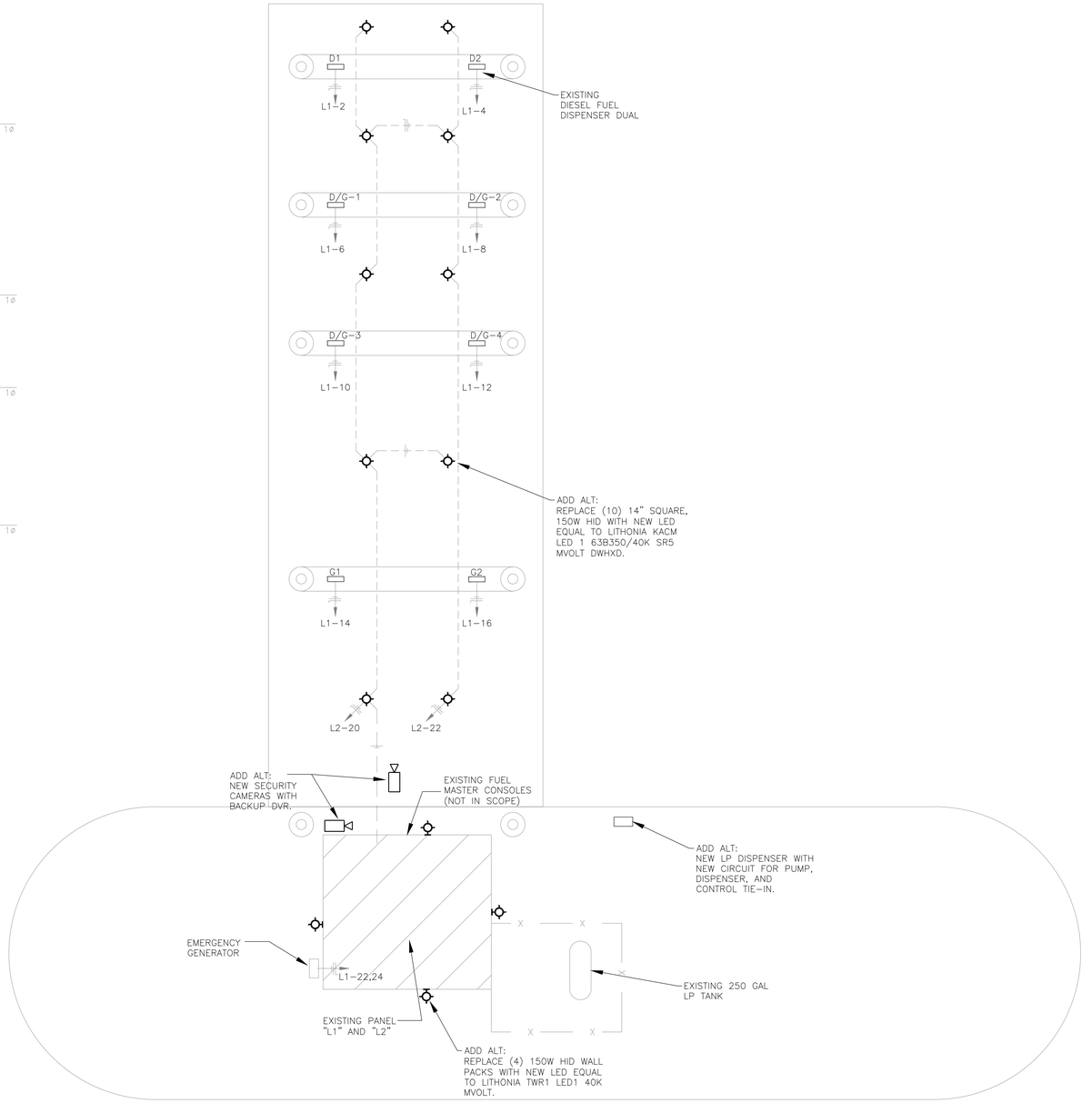
ATTENTION:

THE CONTRACTOR SHALL BE AWARE THAT ONCE THESE PLANS HAVE BEEN SUBMITTED FOR LOCAL CODE PLAN REVIEW AND LOCAL CODE PLAN REVIEW HAS APPROVED THE DRAWINGS FOR CONSTRUCTION PERMIT ISSUE, THE DESIGN PARAMETERS AND LAYOUT OF EQUIPMENT CANNOT BE CHANGED OR MODIFIED IN THE FIELD. ALL CHANGES TO THE DESIGN PARAMETERS AND LAYOUT OF EQUIPMENT ARE REQUIRED TO BE ACCOMPLISHED UNDER THE DIRECTION OF A REGISTERED ENGINEER AND SEALED BY THE SAME. REVISED PLANS, WITH CHANGES IDENTIFIED, SHALL BE RESUBMITTED FOR LOCAL CODE PLAN REVIEW.

VICINITY MAP







GENERAL NOTES:

1. RE-USE EXISTING CIRCUITS WHERE POSSIBLE.
2. TANK PUMP MOTORS SHOWN ARE EXISTING SIZES.

LEGEND

FRP	FIBERGLASS RE-ENFORCED PIPE
O.D.	OUTSIDE DIAMETER
POR	POINT OF REMOVAL
POC	POINT OF CONNECTION
TYP.	TYPICAL
U.G.	UNDER GROUND
V.B.	VALVE BOX

ELECTRICAL PLAN

SCALE: 1/8" = 1'-0"

Mark	Date	Description
REVISIONS:		
1		
2		
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5		
6		

RYAN J. HERTTER
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 106919
STATE OF TENNESSEE
1/26/15

PROJECT NAME
TANK REPLACEMENT AT HALEY ROAD
SHELBY COUNTY GOVERNMENT
6411 HALEY ROAD
MEMPHIS, TENNESSEE

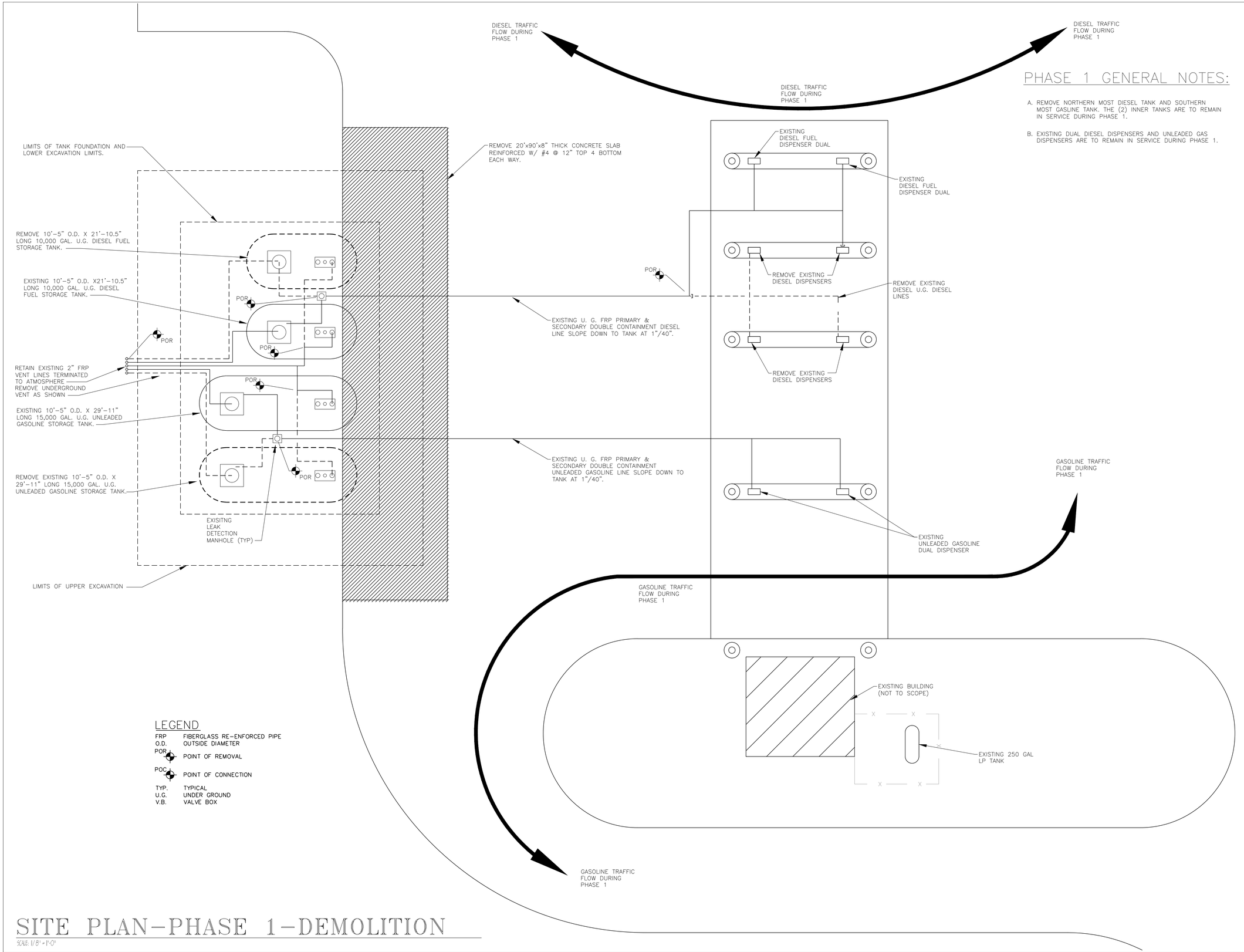
DRAWING NAME
ELECTRICAL PLAN

Hertter Mechanical Services
Ryan J. Hertter, P.E., LEED AP
4700 WILD FERN DR
Bartlett, TN 38135
(901) 827-8016

DATE	01/14/15
SCALE	1/8"=1'-0"
DRAWN BY	PH
DESIGNED BY	RJH
CHECKED BY	RJH

SHEET NO.

E1.1



PHASE 1 GENERAL NOTES:

A. REMOVE NORTHERN MOST DIESEL TANK AND SOUTHERN MOST GASLINE TANK. THE (2) INNER TANKS ARE TO REMAIN IN SERVICE DURING PHASE 1.

B. EXISTING DUAL DIESEL DISPENSERS AND UNLEADED GAS DISPENSERS ARE TO REMAIN IN SERVICE DURING PHASE 1.

LEGEND

FRP	FIBERGLASS RE-ENFORCED PIPE
O.D.	OUTSIDE DIAMETER
POR	POINT OF REMOVAL
POC	POINT OF CONNECTION
TYP.	TYPICAL
U.G.	UNDER GROUND
V.B.	VALVE BOX

SITE PLAN-PHASE 1-DEMOLITION

SCALE: 1/8" = 1'-0"

Mark	Date	Description
REVISIONS:		
1		
2		
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MEMPHIS, TENNESSEE

DRAWING NAME

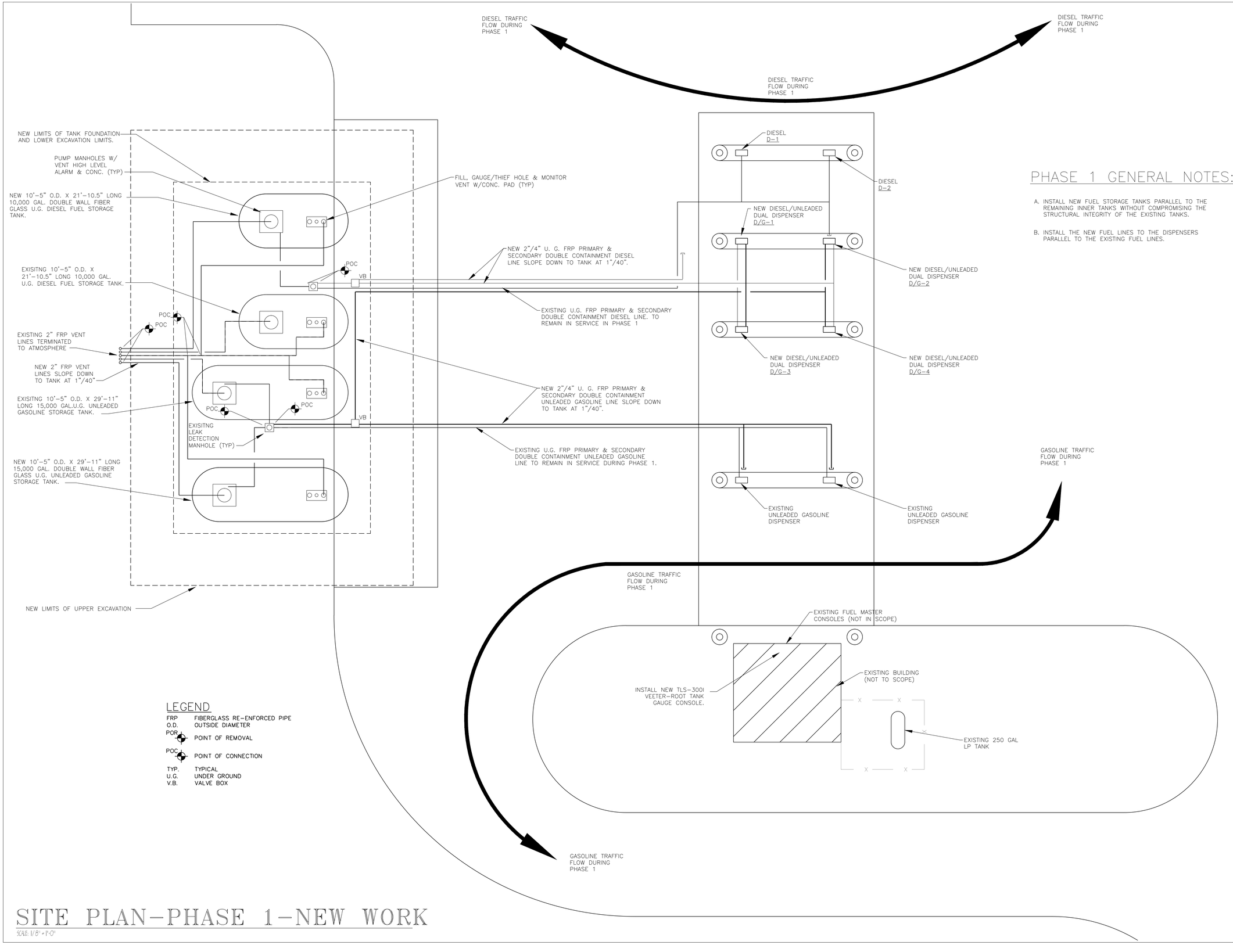
SITE PLAN - PHASE 1 - DEMOLITION

Hertter Mechanical Services
Ryan J. Hertter, P.E., LEED AP
4700 WILD FERN DR
Bartlett, TN 38135
(901) 827-8016

DATE	01/14/15
SCALE	1/8"=1'-0"
DRAWN BY	PH
DESIGNED BY	RJH
CHECKED BY	RJH

SHEET NO.

M1.1



PHASE 1 GENERAL NOTES:

A. INSTALL NEW FUEL STORAGE TANKS PARALLEL TO THE REMAINING INNER TANKS WITHOUT COMPROMISING THE STRUCTURAL INTEGRITY OF THE EXISTING TANKS.

B. INSTALL THE NEW FUEL LINES TO THE DISPENSERS PARALLEL TO THE EXISTING FUEL LINES.

LEGEND

FRP	FIBERGLASS RE-ENFORCED PIPE
O.D.	OUTSIDE DIAMETER
POR	POINT OF REMOVAL
POC	POINT OF CONNECTION
TYP.	TYPICAL
U.G.	UNDER GROUND
V.B.	VALVE BOX

SITE PLAN-PHASE 1-NEW WORK

SCALE: 1/8" = 1'-0"

Mark	Date	Description
REVISIONS:		
1		
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MEMPHIS, TENNESSEE

DRAWING NAME

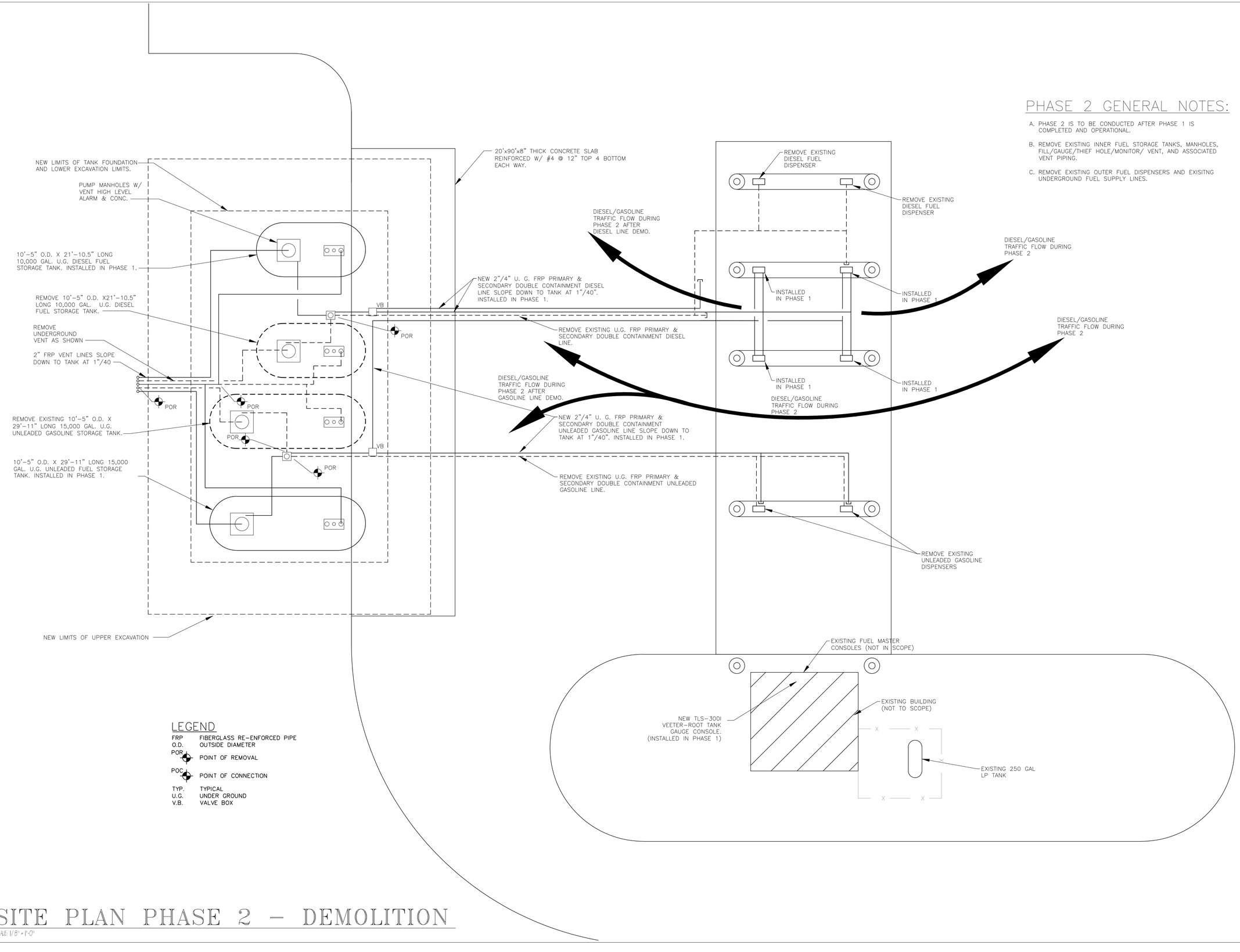
SITE PLAN - PHASE 1 - NEW WORK

Hertter Mechanical Services
Ryan J. Hertter, P.E., LEED AP
4700 WILD FERN DR
Bartlett, TN 38135
(901) 827-8016

DATE	01/14/15
SCALE	1/8"=1'-0"
DRAWN BY	PH
DESIGNED BY	RJH
CHECKED BY	RJH

SHEET NO.

M1.2



PHASE 2 GENERAL NOTES:

A. PHASE 2 IS TO BE CONDUCTED AFTER PHASE 1 IS COMPLETED AND OPERATIONAL.

B. REMOVE EXISTING INNER FUEL STORAGE TANKS, MANHOLES, FILL/GAUGE/THIEF HOLE/MONITOR/ VENT, AND ASSOCIATED VENT PIPING.

C. REMOVE EXISTING OUTER FUEL DISPENSERS AND EXISITNG UNDERGROUND FUEL SUPPLY LINES.

LEGEND

FRP	FIBERGLASS RE-ENFORCED PIPE
O.D.	OUTSIDE DIAMETER
POR	POINT OF REMOVAL
POC	POINT OF CONNECTION
TYP.	TYPICAL
U.G.	UNDER GROUND
V.B.	VALVE BOX

SITE PLAN PHASE 2 - DEMOLITION

SCALE: 1/8" = 1'-0"

Mark	Date	Description
REVISIONS:		
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MEMPHIS, TENNESSEE

DRAWING NAME

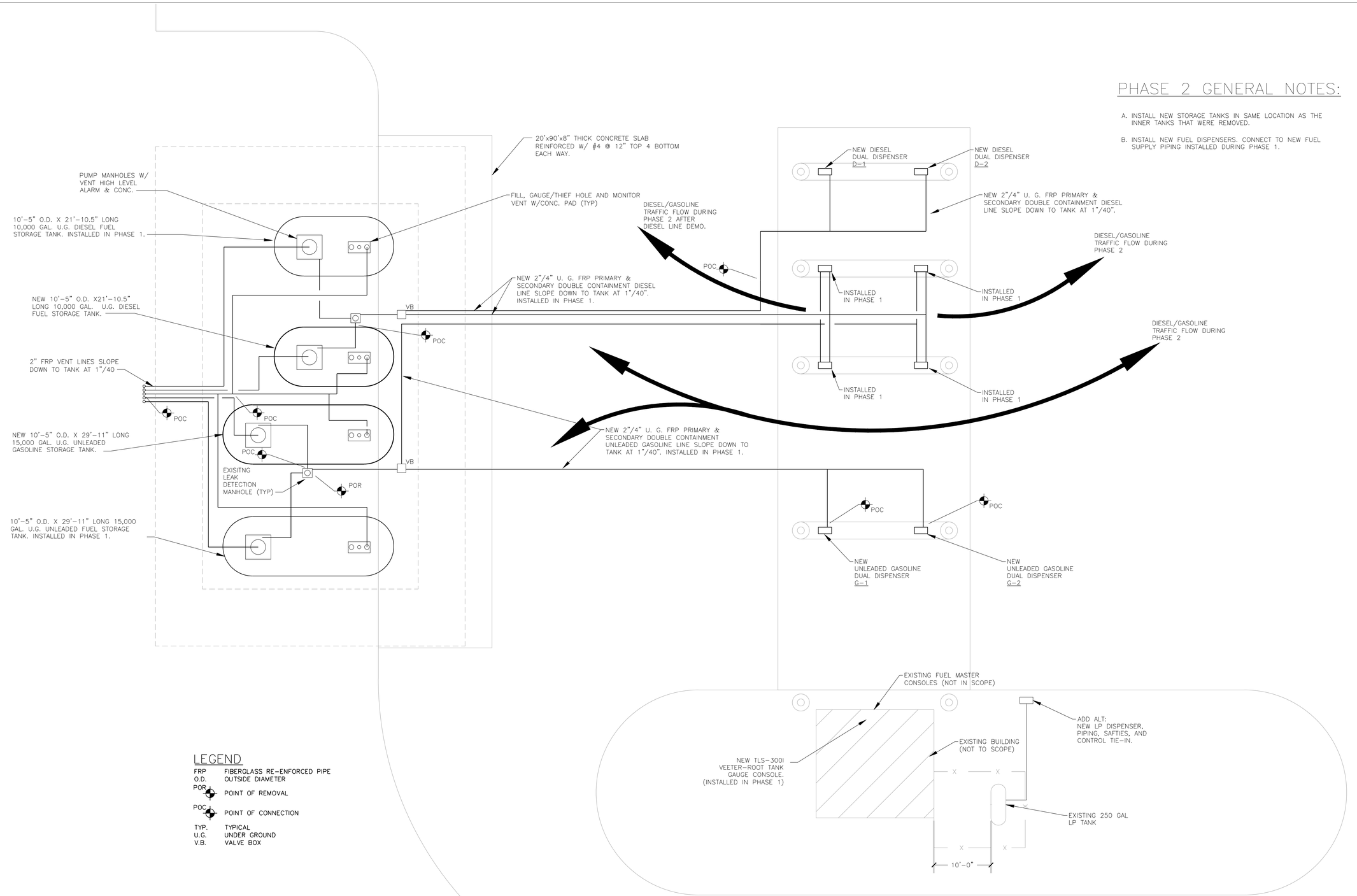
SITE PLAN - PHASE 2 DEMOLITION

Hertter Mechanical Services
Ryan J. Hertter, P.E., LEED AP
4700 WILD FERN DR
Bartlett, TN 38135
(901) 827-8016

DATE	01/14/15
SCALE	1/8"=1'-0"
DRAWN BY	PH
DESIGNED BY	RJH
CHECKED BY	RJH

SHEET NO.

M2.1



PHASE 2 GENERAL NOTES:

A. INSTALL NEW STORAGE TANKS IN SAME LOCATION AS THE INNER TANKS THAT WERE REMOVED.

B. INSTALL NEW FUEL DISPENSERS. CONNECT TO NEW FUEL SUPPLY PIPING INSTALLED DURING PHASE 1.

LEGEND

FRP.	FIBERGLASS RE-ENFORCED PIPE
O.D.	OUTSIDE DIAMETER
POR	POINT OF REMOVAL
POC	POINT OF CONNECTION
TYP.	TYPICAL
U.G.	UNDER GROUND
V.B.	VALVE BOX

SITE PLAN-PHASE 2-NEW WORK

SCALE: 1/8" = 1'-0"

Mark	Date	Description

REVISIONS:
1
2
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6

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DRAWING NAME
SITE PLAN - PHASE 2 - NEW WORK

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Bartlett, TN 38135
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DATE	01/14/15
SCALE	1/8"=1'-0"
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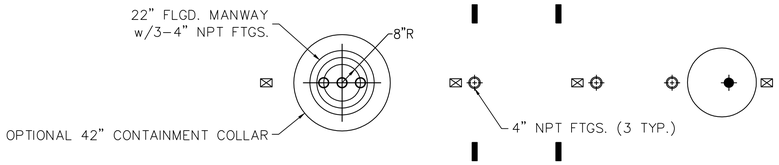
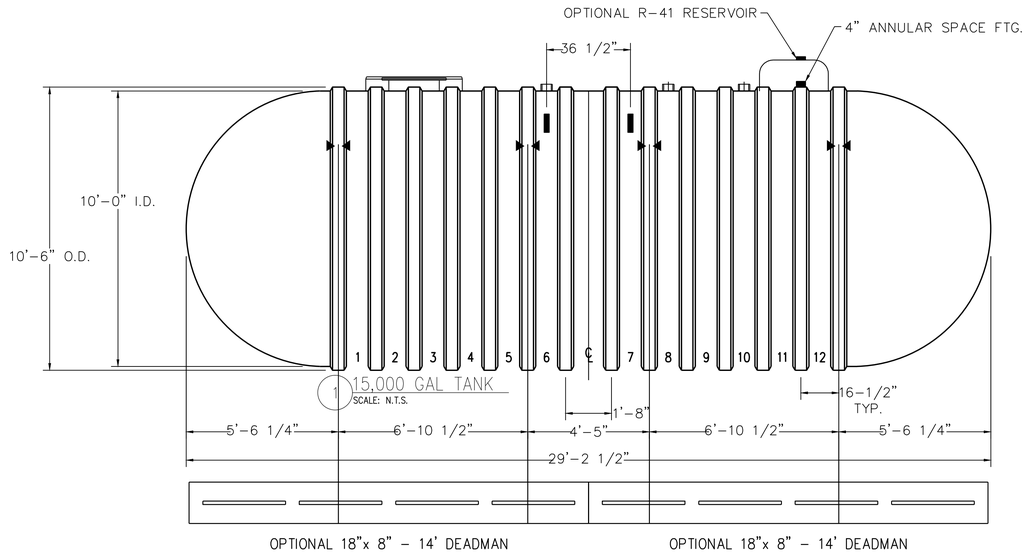
M2.2

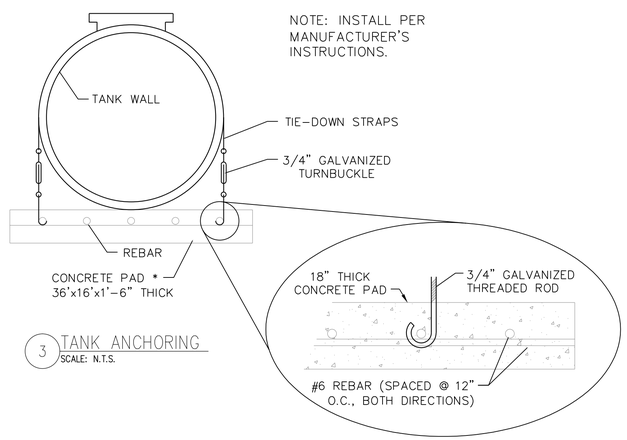




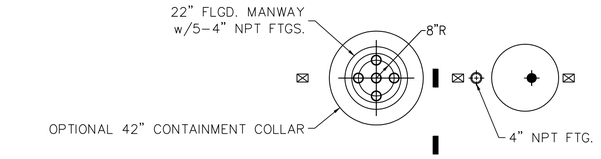
1 15,000 GAL TANK
SCALE: N.T.S.

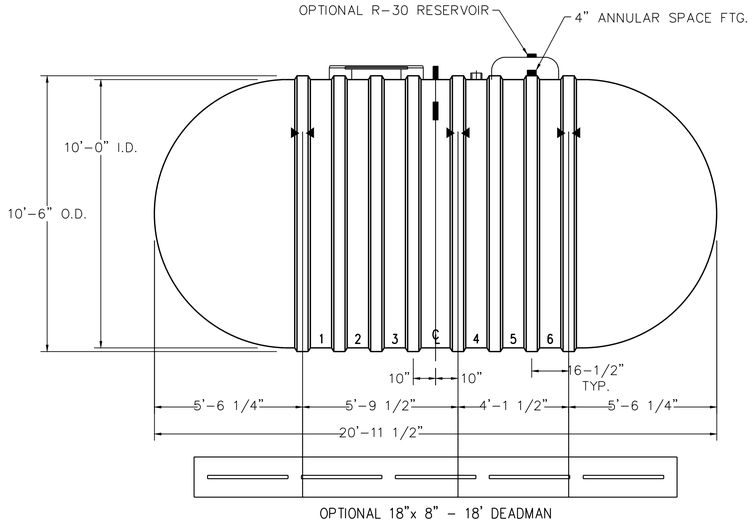
NOTES:

- ⊠ HOLD DOWN STRAP CLIP
- ▶◀ HOLD DOWN STRAP LOCATION
- ▯ TYPE "13" LIFT LUG - SD
- ▮ TYPE "13" LIFT LUG - HD

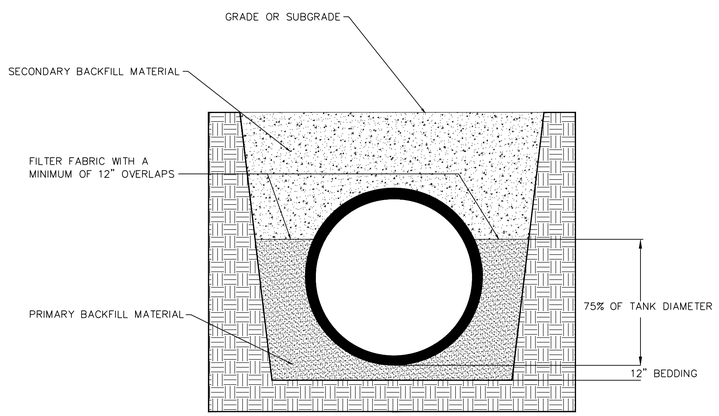


3 TANK ANCHORING
SCALE: N.T.S.





2 10,000 GAL TANK
SCALE: N.T.S.



4 TYPICAL SPLIT BACKFILL INSTALLATION
SCALE: N.T.S.

DETAILS
SCALE: NTS

Mark	Date	Description

REVISIONS:
1
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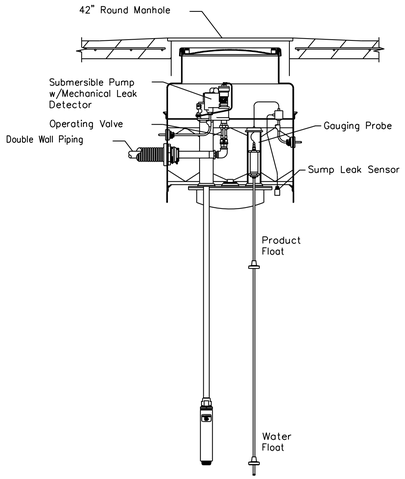
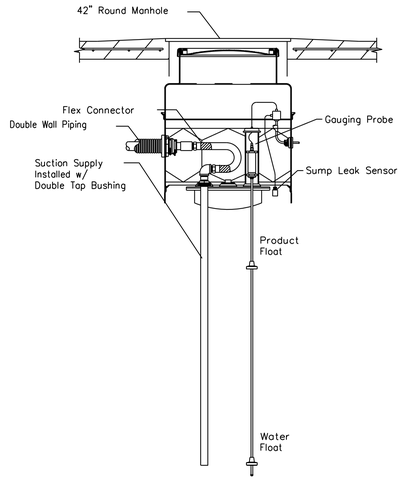
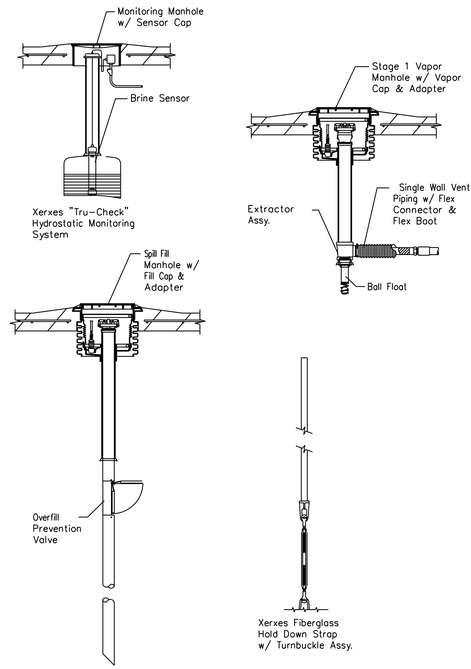
SHEET NO.
M3.1



1 TANK SUBMERSIBLE PUMP
SCALE: N.T.S.



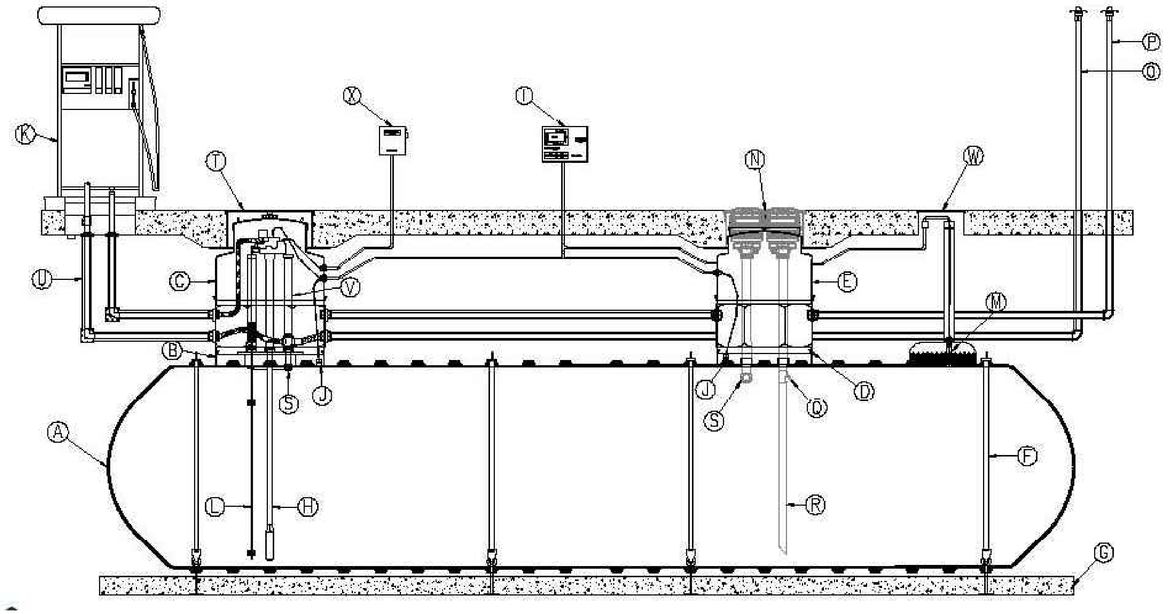
2 TANK SUCTION
SCALE: N.T.S.



3 MISC. COMPONENTS
SCALE: N.T.S.

MARK	QTY	SIZE	EQUIPMENT LISTING	MARK	QTY	SIZE	EQUIPMENT LISTING	MARK	QTY	SIZE	EQUIPMENT LISTING
A	1	8'	HYDROSTATIC DOUBLE WALL TANK	I	1*		INVENTORY & LEAK DETECTION PANEL	Q	1*		OVERFILL PREVENTION VALVE
B	1	48"	SINGLE WALL CONTAINMENT COLLAR	J	2*		CONTAINMENT COLLAR SENSOR	R	1*	4"	DROP TUBE
C	1	48"	SW PTS WATER TIGHT TURBINE SUMP	K	1*		FUEL DISPENSER w/UDC	S	2*	4"	BALL FLOAT ASSEMBLY
D	1	42"	SINGLE WALL CONTAINMENT COLLAR	L	1*		TANK INVENTORY GAUGE	T	1*	36"	WATERTIGHT MANHOLE
E	1	42"	SW PTS FILL/VAPOR SUMP	M	1*		HYDROSTATIC TANK RESERVOIR SENSOR	U	*	3"x2"	DOUBLE WALL FRP PIPE
F	4		HOLD DOWN SPLIT STRAP ASSEMBLY	N	1*	36"	FILL/VAPOR MANHOLE	V	1*	4"	EXTRACTOR HOUSING w/CAP
G	4	16'	12"x 12" CONCRETE DEADMAN ANCHORS	O	1*	2"	PRIMARY TANK VENT	W	1*	18"	MANHOLE
H	1*		SUBMERSIBLE PUMP w/LEAK DETECTION	P	1*	2"	SUMP VENTS	X	1*		PUMP CONTROL PANEL

NOTE: * SUPPLIED BY OTHERS



4 TYPICAL PETROLEUM ILLUSTRATION
SCALE: N.T.S.

DETAILS
SCALE: NTS

Mark	Date	Description
REVISIONS:		
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DETAILS

Hertter Mechanical Services
Ryan J. Hertter, P.E., LEED AP
4700 WILD FERN DR
Barlett, TN 38135
(901) 827-8016

DATE	01/14/15
SCALE	NTS
DRAWN BY	PH
DESIGNED BY	RJH
CHECKED BY	RJH

SHEET NO.
M3.2

SECTION 02 65 00
UNDERGROUND STORAGE TANK REMOVAL

PART 1 - GENERAL

1.1 DESCRIPTION:

A. UNDERGROUND STORAGE TANK (UST) LIQUID REMOVAL:
1. MATERIAL (LIQUID) TESTING.
2. LIQUID REMOVALS AND DISPOSAL.
3. CERTIFICATION OF LIQUID CONTENTS AND DISPOSAL.

B. UNDERGROUND STORAGE TANK CLEANING AND DISPOSAL:
1. EXCAVATION OF TANK.
2. REMOVALS AND DISPOSAL OF TANK MATERIAL.
3. EVACUATION OF COMBUSTIBLE VAPORS WITHIN SOILS.
4. TANK CLEANING.
5. DISASSEMBLING OF TANK.
6. CERTIFICATION FOR PROPER DISPOSAL OF TANK.

C. CONTAMINATION ASSESSMENT:
1. SOIL TESTING.
2. CONTAMINATED SOIL DISPOSAL
3. CERTIFICATION FOR PROPER DISPOSAL OF CONTAMINATED SOIL.

D. REPORT:
1. WRITTEN REPORT DESCRIBING IN DETAIL THE PROCEDURES USED TO REMOVE THE LIQUID FROM THE UNDERGROUND STORAGE TANK, CLEANING AND REMOVING OF THE UNDERGROUND STORAGE TANK, AND DISPOSAL OF THE LIQUID RESIDUES.
2. PHOTOGRAPHIC DOCUMENTATION OF THE WORK, INCLUDING LAB AND FIELD RESULTS, AND RECEIPTS FROM THE PROPER AUTHORITY FOR THE TANK AND RESIDUE DISPOSAL.

1.2 QUALITY ASSURANCE:

A. UNDERGROUND STORAGE TANK REMOVAL AND DISPOSAL SHALL COMPLY WITH THE FOLLOWING:
1. AMERICAN PETROLEUM INSTITUTE (API) RECOMMENDED PRACTICE 1604.
2. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA), 40 CFR PART 280.
3. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA), TEST METHODS FOR PETROLEUM HYDROCARBONS, SW-846.
4. OSHA STANDARDS 29 CFR PART 1910 AND 1926.

1.3 SUBMITTALS:

A. FURNISH THE FOLLOWING:
1. NOTICE OF INTENT TO CLOSE THE UST.
2. DOCUMENTATION OF DISPOSAL OF TANK AN APPROVED DISPOSAL SITE.
3. DOCUMENTATION OF DISPOSAL OF LIQUID MATERIAL TO AN APPROVED DISPOSAL SITE.
4. DOCUMENTATION OF DISPOSAL OF CONTAMINATED SOIL TO AN APPROVED DISPOSAL SITE.
5. CERTIFICATION DOCUMENTS THAT PERSONNEL ARE QUALIFIED FOR UST CLOSURES.
6. SIX COPIES OF FINAL CLOSURE REPORT INCLUDING ALL SAMPLE TESTS.

B. FURNISHED DETAILED CADD GENERATED SUBMITTALS INCLUDING:
1. DETAILED PLAN VIEW
2. PIPING REMOVAL DIAGRAMS
3. CONTROL REMOVAL DIAGRAMS
4. COMPONENT DIAGRAMS INCLUDING TANK REMOVAL PROCEDURE
5. DETAILED SEQUENCE OF PROCEDURE
6. LOCAL FIRE MARSHAL REQUIREMENT
7. HAZARDOUS MATERIAL PLAN FOR LOCAL EPA MANAGEMENT
8. STATE AGENCY REQUIREMENTS.

1.4 APPLICABLE PUBLICATIONS:

A. THE PUBLICATIONS LISTED BELOW FORM A PART OF THIS SPECIFICATION TO THE EXTENT REFERENCED. THE PUBLICATIONS ARE REFERENCED IN THE TEXT BY THE BASIC DESIGNATION ONLY.

B. AMERICAN PETROLEUM INSTITUTE (API):

1604-(2010)	CLOSURE OF UNDERGROUND PETROLEUM STORAGE TANKS

C. AMERICAN SOCIETY OF TESTING MATERIALS (ASTM):

E1739-95(R2010)E1	STANDARD GUIDE FOR RISK-BASED CORRECTIVE ACTION APPLIED AT PETROLEUM RELEASE SITES
E1912-98(2004)	STANDARD GUIDE FOR ACCELERATED SITE CHARACTERIZATION FOR CONFIRMED OR SUSPECTED PETROLEUM RELEASES
E1943-98(2010)	GUIDE FOR REMEDIATION OF GROUND WATER BY NATURAL ATTENUATION AT PETROLEUM RELEASE SITES

1.5 PROJECT SITE CONDITIONS:

1. DO NOT CLOSE OR OBSTRUCT STREETS, SIDEWALKS OR DRIVES WITHOUT PERMISSION AND APPROVAL OF THE OWNER (SHELBY COUNTY GOVERNMENT). SUBMIT TO ENGINEER THE CLOSURE PLAN 30 DAYS PRIOR TO CONSTRUCTION.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL:

A. NOTIFY THE REGULATING STATE AGENCY AT LEAST 30 DAYS PRIOR TO CLOSURE OF THE SITE.
B. DETERMINE IF CONTAMINATION FROM THE UST IS PRESENT.
C. IF CONTAMINATION EXISTS NOTIFY THE ENGINEER FOR PROPER RECORDING OF THE SITE FOR A PERIOD SET BY THE STATE AGENCY AND/OR EPA.
D. REMOVE UNDERGROUND STORAGE TANK, LIQUID, AND ASSOCIATED WORK, INCLUDING SOIL REMOVAL AS SPECIFIED AND INDICATED ON THE DRAWINGS.
E. RESTORE THE EXCAVATED AREA WITH NEW MATERIALS AS SPECIFIED TO MATCH ADJACENT (EXISTING) SURFACES.

3.2 UNDERGROUND STORAGE TANK LIQUID REMOVAL:

A. PROVIDE SAMPLES OF LIQUIDS FROM THE UNDERGROUND FUEL STORAGE TANK TO A QUALIFIED STATE CERTIFIED HAZARDOUS WASTE TESTING FACILITY FOR LABORATORY ANALYSIS AND APPROVAL FOR THE LIQUID DISPOSAL AND DISPOSAL LOCATION.
B. REMOVE THE LIQUID FROM THE TANK FOR DISPOSAL PRIOR TO REMOVING THE TANK FROM THE GROUND.
C. PROVIDE DOCUMENTATION OF THE LIQUID REMOVAL AND ITS DISPOSAL IN A FINAL REPORT TO THE CONTRACTING OFFICER.

3.3 UNDERGROUND STORAGE TANK CLEANING AND DISPOSAL:

A. TANK SHALL BE REVIEWED AND CERTIFIED CLEAN BY LOCAL, FIRE MARSHAL, AND STATE AGENCY.
B. REMOVE THE TANK FROM THE GROUND, PLACE IT ON THE GROUND ADJACENT TO REMOVAL LOCATION, AND SECURE IT PRIOR TO CLEANING.
C. MEASURE LEVELS OF COMBUSTIBLE VAPORS AND OXYGEN, AND INITIATE VENTILATION OF THE TANK, IF NEEDED:
1. VENTILATE TANK USING A SMALL GAS EXHAUSTER UNTIL THE VAPOR CONCENTRATION IS REDUCED TO 10 PERCENT OR LESS OF THE LOWER EXPLOSIVE LIMIT.
2. OXYGEN CONTENT SHALL RANGE FROM 19.5 TO 23.5 PERCENT.
3. CUT ACCESS PORTS FOR CLEANING INTO TANK AFTER VAPOR AND OXYGEN CONCENTRATIONS HAVE MET THE REQUIREMENTS NOTED ABOVE.

D. CLEANING OF THE TANK SHALL INCLUDE MOPPING, SCRAPING, AND SWEEPING THE INTERIOR OF THE TANK.
E. COLLECT, CONTAIN AND PLACE RESIDUALS IN A UNITED STATES DEPARTMENT OF TRANSPORTATION (DOT) APPROVED TYPE 17H, 200 L (55 GALLON) CAPACITY DRUM, FOR TRANSPORTING AND DISPOSAL.
F. ENSURE FINAL VAPOR AND OXYGEN CONCENTRATION ARE WITHIN THE REQUIREMENTS NOTED ABOVE BEFORE PROCEEDING TO CUT AND DISMANTLE THE TANK FOR ITS DISPOSAL.
G. REMOVE DISMANTLED TANK TO AN APPROVED DISPOSAL FACILITY.
H. OBTAIN DISPOSAL FACILITY RECEIPTS NOTING PROPER TANK DISPOSAL.

3.4 REMOVED TANK AREA ASSESSMENT:

A. COLLECT FIVE SOIL SAMPLES FROM THE REMOVED UNDERGROUND STORAGE TANK AREA. SHOW THE LOCATION OF THE SOIL SAMPLES ON THE AS-BUILT PLAN SHEET. TAKE ONE SAMPLE FROM EACH OF THE SIDEWALLS, AND ONE SAMPLE FROM THE BASE. CONTAINERIZE THE SAMPLES IN GLASS SAMPLE JAR(S), SEAL WITH TEFLON-COATED LIDS, AND PLACE THE JAR ON ICE. DELIVER SAMPLES WITH COMPLETED CHAIN-OF-CUSTODY DOCUMENTATION TO THE LABORATORY. LABORATORY SHALL ANALYZE EACH SAMPLE FOR TOTAL PETROLEUM HYDROCARBON (TPH) CONCENTRATIONS AS PER EPA SW-846.
B. SITE RESTORATION: RESTORE SITE WITH IMPORTED CLEAN SOIL OR SAND. REPLACE ANY PAVEMENTS SIDEWALKS, AND/OR CURBS TO MATCH ADJACENT MATERIAL. RESTORE LANDSCAPED AREAS AND GRASS AREAS TO MATCH ADJACENT MATERIAL.

3.5 CONTAMINATED SOIL:

A. WHEN SOIL ASSESSMENTS REVEAL EVIDENCE OF LEAKAGE OR SPILLAGE OF HYDROCARBONS AT LEVELS ABOVE THOSE ESTABLISHED BY THE EPA, COLLECT SIX (6) ADDITIONAL SOIL SAMPLES BEYOND THE BOUNDARIES OF THE ORIGINAL TANK LOCATION. SAMPLES TO BE TAKEN 20 FEET (6 M) FROM EDGE OF TANK WALL LOCATION AS FOLLOWS:2 SAMPLES ON EACH SIDE, RIGHT AND LEFT, OF LONG AXIS OF TANK AND ONE SAMPLE BOTH ENDS OF THE TANK. IF CONTAMINATION STILL EXISTS, NOTIFY THE ENGINEER TO DETERMINE ADDITIONAL TESTING THAT WILL BE REQUIRED. THE BASE PRICE FOR VOLUME BETWEEN THE FINAL TANK VOLUME OF MATERIAL FOR THE ENCLOSURE AND THE ENCLOSURE SHALL NOT TO EXCEED 100 CUBIC YARDS (76 CUBIC METERS) OF SOIL REMOVED. ANY WORK BEYOND 100 CUBIC YARDS (76 CUBIC METERS) AND MORE THAN 6 TEST LOCATIONS SHALL BE CONSIDERED EXTRA AND SHALL BE BASED ON UNIT PRICING.
B. CONTINUE THE SOIL CONTAMINATION ASSESSMENT TESTING AROUND THE TANK UNTIL THE CONTAMINATION LEVEL IS WITHIN ACCEPTABLE LEVEL, LESS THAN 100 PARTS PER MILLION.
C. REMOVE ALL CONTAMINATED SOIL FROM THE SITE AND HAUL IT AS PER EPA PROTOCOL.

END OF SECTION 026500

SECTION 231113 - FACILITY FUEL-OIL PIPING

PART 1 - GENERAL

1.1 SUMMARY
A. THIS SECTION INCLUDES FUEL-OIL AND DIESEL-FUEL-OIL DISTRIBUTION SYSTEMS AND THE FOLLOWING:
1. PIPES, TUBES, AND FITTINGS.
2. PIPING AND TUBING JOINING MATERIALS.
3. PIPING SPECIALTIES.
4. VALVES.
5. FRP FUEL-OIL USTS.
6. FUEL-OIL UST ACCESSORIES.
7. FUEL-OIL STORAGE TANK PIPING SPECIALTIES.
8. FUEL-TRANSFER PUMPS.
9. LEAK-DETECTION AND MONITORING SYSTEM.
10. CONCRETE BASES.

1.2 PERFORMANCE REQUIREMENTS
A. MAXIMUM OPERATING-PRESSURE RATINGS: 3-PSIG (21-KPA) FUEL-OIL SUPPLY PRESSURE AT OIL-FIRED APPLIANCES.
B. DELEGATED DESIGN: DESIGN RESTRAINT AND ANCHORS FOR FUEL-OIL PIPING AND EQUIPMENT, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

1.3 SUBMITTALS
A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.
B. SHOP DRAWINGS: FOR FACILITY FUEL-OIL PIPING LAYOUT. INCLUDE PLANS, PIPING LAYOUT AND ELEVATIONS, SECTIONS, AND DETAILS FOR FABRICATION OF PIPE ANCHORS, HANGERS, SUPPORTS FOR MULTIPLE PIPES, ALIGNMENT GUIDES, EXPANSION JOINTS AND LOOPS, AND ATTACHMENTS OF THE SAME TO BUILDING STRUCTURE. DETAIL LOCATION OF ANCHORS, ALIGNMENT GUIDES, AND EXPANSION JOINTS AND LOOPS.
C. DELEGATED-DESIGN SUBMITTAL: FOR FUEL-OIL PIPING AND EQUIPMENT INDICATED TO COMPLY WITH PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA, INCLUDING ANALYSIS DATA SIGNED AND SEALED BY THE QUALIFIED PROFESSIONAL ENGINEER RESPONSIBLE FOR THEIR PREPARATION.
1. DETAIL FABRICATION AND ASSEMBLY OF ANCHORS AND SEISMIC RESTRAINTS.
2. DESIGN CALCULATIONS: CALCULATE REQUIREMENTS FOR SELECTING SEISMIC RESTRAINTS.
3. DETAIL FABRICATION AND ASSEMBLY OF PIPE ANCHORS, HANGERS, SUPPORTS FOR MULTIPLE PIPES, AND ATTACHMENTS OF THE SAME TO BUILDING STRUCTURE.
F. FIELD QUALITY-CONTROL REPORTS.
G. OPERATION AND MAINTENANCE DATA.

1.4 QUALITY ASSURANCE
A. BRAZING: QUALIFY PROCESSES AND OPERATORS ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE: SECTION IX.
B. STEEL SUPPORT WELDING QUALIFICATIONS: QUALIFY PROCEDURES AND PERSONNEL ACCORDING TO AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE - STEEL."
C. PIPE WELDING QUALIFICATIONS: QUALIFY PROCEDURES AND OPERATORS ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE.
D. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
E. COMPLY WITH ASME B31.9, "BUILDING SERVICES PIPING," FOR FUEL-OIL PIPING MATERIALS, INSTALLATION, TESTING, AND INSPECTING.
F. COMPLY WITH REQUIREMENTS OF THE EPA AND OF STATE AND LOCAL AUTHORITIES HAVING JURISDICTION. INCLUDE RECORDING OF FUEL-OIL STORAGE TANKS AND MONITORING OF TANKS AND PIPING.

1.5 WARRANTY AND INSURANCE
A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE COMPONENTS OF FUEL-OIL STORAGE TANKS AND FLEXIBLE, DOUBLE-CONTAINMENT PIPING AND RELATED EQUIPMENT THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD.
1. STORAGE TANKS:
a. FAILURES INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING WHEN USED FOR STORAGE OF FUEL OIL AT TEMPERATURES NOT EXCEEDING 150 DEG F (66 DEG C):
1) STRUCTURAL FAILURES INCLUDING CRACKING, BREAKUP, AND COLLAPSE.
b. WARRANTY PERIOD: 30 YEARS FROM DATE OF SUBSTANTIAL COMPLETION. A THIRD PART STEEL TANK INSTITUTE WARRANTY IS REQUIRED. MANUFCTURER'S WARRANTY IS NOT ACCEPTABLE.
2. FLEXIBLE, DOUBLE-CONTAINMENT PIPING AND RELATED EQUIPMENT:
a. FAILURES DUE TO DEFECTIVE MATERIALS OR WORKMANSHIP FOR MATERIALS INSTALLED TOGETHER, INCLUDING PIPING, DISPENSER SUMPS, ENTRY BOOTS, AND SUMP MOUNTING ADAPTERS.
b. WARRANTY PERIOD: 30 YEARS FROM DATE OF SUBSTANTIAL COMPLETION.
3. THE CONTRACTOR SHALL HOLD A CURRENT SHELBY COUNTY CONTRACTOR'S LICENSE AND HAVE BEEN IN BUSINESS FOR A MINIMUM OF TEN YEARS.
4. THE CONTRACTOR SHALL PROVIDE POLLUTION LIABILITY INSURANCE.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS
A. SEE PART 3 PIPING SCHEDULE ARTICLES FOR WHERE PIPES, TUBES, FITTINGS, AND JOINING MATERIALS ARE APPLIED IN VARIOUS SERVICES.
B. STEEL PIPE: ASTM A 53/A 53M, BLACK STEEL, SCHEDULE 40, TYPE E OR S, GRADE B.
1. MALLEABLE-IRON THREADED FITTINGS: ASME B16.3, CLASS 150, STANDARD PATTERN.
2. WROUGHT-STEEL WELDING FITTINGS: ASTM A 234/A 234M, FOR BUTT AND SOCKET WELDING.
3. UNIONS: ASME B16.39, CLASS 150, MALLEABLE IRON WITH BRASS-TO-IRON SEAT, GROUND JOINT, AND THREADED ENDS.
4. PROTECTIVE COATING FOR UNDERGROUND PIPING: FACTORY-APPLIED, THREE-LAYER COATING OF EPOXY, ADHESIVE, AND PE.
a. JOINT COVER KITS: EPOXY PAINT, ADHESIVE, AND HEAT-SHRINK PE SLEEVES.

2.2 DOUBLE-CONTAINMENT PIPE AND FITTINGS
A. FLEXIBLE, DOUBLE-CONTAINMENT PIPING: COMPLY WITH UL 971.
1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
a. ENVIRON PRODUCTS, INC.
b. OPW - FLEXWORKS C20/APX40
c. DUALOY 3000/LCK
2. PIPE MATERIALS: PVDF COMPLYING WITH ASTM D 3222 FOR CARRIER PIPE WITH MECHANICAL COUPLINGS TO SEAL CARRIER, AND PE PIPE COMPLYING WITH ASTM D 4976 FOR CONTAINMENT PIPING.
3. FIBERGLASS OR PE SUMPS.
4. WATERTIGHT SUMP ENTRY BOOTS, PIPE ADAPTERS WITH TEST PORTS AND TUBES, COAXIAL FITTINGS, AND COUPLINGS.
5. MINIMUM OPERATING PRESSURE RATING: 10 PSIG (69 KPA).
6. PLASTIC TO STEEL PIPE TRANSITION FITTINGS: FACTORY-FABRICATED FITTINGS WITH PLASTIC END MATCHING OR COMPATIBLE WITH CARRIER PIPING, AND STEEL PIPE END COMPLYING WITH ASTM A 53/A 53M, BLACK STEEL, SCHEDULE 40, TYPE E OR S, GRADE B.
7. INCLUDE DESIGN AND FABRICATION OF DOUBLE-CONTAINMENT PIPE AND FITTING ASSEMBLIES WITH PROVISION FOR FIELD INSTALLATION OF CABLE LEAK-DETECTION SYSTEM IN ANNULAR SPACE BETWEEN CARRIER AND CONTAINMENT PIPING.

2.3 PIPING SPECIALTIES
A. Y-PATTERN STRAINERS:
1. BODY: ASTM A 126, CLASS B, CAST IRON WITH BOLTED COVER AND BOTTOM DRAIN CONNECTION.
2. END CONNECTIONS: THREADED ENDS FOR NPS 2 (DN 50) AND SMALLER.
3. STRAINER SCREEN: 60-MESH STARTUP STRAINER, AND PERFORATED STAINLESS-STEEL BASKET WITH 50 PERCENT FREE AREA.
4. CWP RATING: 125 PSIG (860 KPA).
B. MANUAL AIR VENTS:
1. BODY: BRONZE.
2. INTERNAL PARTS: NONFERROUS.
3. OPERATOR: SCREWDRIVER OR THUMBSCREW.
4. INLET CONNECTION: NPS 1/2 (DN 15).
5. DISCHARGE CONNECTION: NPS 1/8 (DN 6).
6. CWP RATING: 150 PSIG (1035 KPA).
7. MAXIMUM OPERATING TEMPERATURE: 225 DEG F (107 DEG C).

2.4 JOINING MATERIALS
A. JOINT COMPOUND AND TAPE: SUITABLE FOR FUEL OIL.
B. WELDING FILLER METALS: COMPLY WITH AWS D10.12/D10.12M FOR WELDING MATERIALS APPROPRIATE FOR WALL THICKNESS AND CHEMICAL ANALYSIS OF STEEL PIPE BEING WELDED.
C. BRAZING FILLER METALS: ALLOY WITH MELTING POINT GREATER THAN 1000 DEG F (540 DEG C) COMPLYING WITH AWS A5.8/A5.8M. BRAZING ALLOYS CONTAINING MORE THAN 0.05 PERCENT PHOSPHORUS ARE PROHIBITED.

2.5 MANUAL FUEL-OIL SHUTOFF VALVES
A. SEE VALVE SCHEDULE IN PART 3 FOR WHERE EACH VALVE TYPE IS APPLIED IN VARIOUS SERVICES.
B. GENERAL REQUIREMENTS FOR METALLIC VALVES: COMPLY WITH UL 842.
1. CWP RATING: 125 PSIG (860 KPA).
2. THREADED ENDS: COMPLY WITH ASME B1.20.1.
3. DRYSEAL THREADS ON FLARE ENDS: COMPLY WITH ASME B1.20.3.
4. TAMPERPROOF FEATURE: LOCKING FEATURE FOR VALVES INDICATED IN THE VALVE SCHEDULE.
5. SERVICE MARK: INITIALS "WOG" SHALL BE PERMANENTLY MARKED ON VALVE BODY.

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C. TWO-PIECE, FULL-PORT, BRONZE BALL VALVES WITH BRONZE TRIM: MSS SP-110.
1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
a. BRASSCRAFT MANUFACTURING COMPANY; A MASCO COMPANY.
b. CONBRACO INDUSTRIES, INC.; APOLLO DIV.
c. LYALL, R. W. & COMPANY, INC.
d. MCDONALD, A. Y. MFG. CO.
e. PERFECTION CORPORATION; A SUBSIDIARY OF AMERICAN METER COMPANY.
2. BODY: BRONZE, COMPLYING WITH ASTM B 584.
3. BALL: CHROME-PLATED BRONZE.
4. STEM: BRONZE; BLOWOUT PROOF.
5. SEATS: REINFORCED TFE; BLOWOUT PROOF.
6. PACKING: THREADED-BODY PACKNUT DESIGN WITH ADJUSTABLE-STEM PACKING.
7. ENDS: THREADED, FLARED, OR SOCKET AS INDICATED IN THE VALVE SCHEDULE.
8. CWP RATING: 600 PSIG (4140 KPA).
9. SERVICE MARK: INITIALS "WOG" SHALL BE PERMANENTLY MARKED ON VALVE BODY.

2.6 SPECIALTY VALVES
A. PRESSURE RELIEF VALVES: COMPLY WITH UL 842.
1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
a. ANDERSON GREENWOOD; DIVISION OF TYCO FLOW CONTROL.
b. FULFLO SPECIALTIES, INC.
c. WEBSTER FUEL PUMPS & VALVES; A DIVISION OF CAPITAL CITY TOOL, INC.
2. LISTED AND LABELED FOR FUEL-OIL SERVICE BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
3. BODY: BRASS, BRONZE, OR CAST STEEL.
4. SPRINGS: STAINLESS STEEL, INTERCHANGEABLE.
5. SEAT AND SEAL: NITRILE RUBBER.
6. ORIFICE: STAINLESS STEEL, INTERCHANGEABLE.
7. FACTORY-APPLIED FINISH: BAKED ENAMEL.
8. MAXIMUM INLET PRESSURE: 150 PSIG (1035 KPA).
9. RELIEF PRESSURE SETTING: 60 PSIG (414 KPA).
B. OIL SAFETY VALVES: COMPLY WITH UL 842.
1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
a. ANDERSON GREENWOOD; DIVISION OF TYCO FLOW CONTROL.
b. SUNTEC INDUSTRIES INCORPORATED.
c. WEBSTER FUEL PUMPS & VALVES; A DIVISION OF CAPITAL CITY TOOL, INC.
2. LISTED AND LABELED FOR FUEL-OIL SERVICE BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
3. BODY: BRASS, BRONZE, OR CAST STEEL.
4. SPRINGS: STAINLESS STEEL.
5. SEAT AND DIAPHRAGM: NITRILE RUBBER.
6. ORIFICE: STAINLESS STEEL, INTERCHANGEABLE.
7. FACTORY-APPLIED FINISH: BAKED ENAMEL.
8. MANUAL OVERRIDE PORT.
9. MAXIMUM INLET PRESSURE: 60 PSIG (414 KPA).
10. MAXIMUM OUTLET PRESSURE: 3 PSIG (21 KPA).

2.7 FRP FUEL-OIL UST
A. BASIS-OF-DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT INDICATED ON DRAWINGS OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:
1. CONTAINMENT SOLUTIONS, INC.
2. XERXES CORPORATION.
B. DESCRIPTION: HORIZONTAL, FRP UST; UL 1316, DOUBLE WALL, WITH INTERSTITIAL SPACE.
C. CONSTRUCTION: FABRICATED WITH FIBERGLASS-REINFORCED POLYESTER RESINS; SUITABLE FOR OPERATION AT ATMOSPHERIC PRESSURE; FABRICATED FOR THE FOLLOWING LOADS:
1. DEPTH OF BURY: 3 FEET (1 M) FROM TOP OF TANK TO FINISHED SURFACE.
2. EXTERNAL HYDROSTATIC PRESSURE: TO WITHSTAND GENERAL BUCKLING WITH SAFETY FACTOR OF 2:1 IF HOLE IS FULLY FLOODED.
3. SURFACE LOADS: AASHTO'S "SPECIFICATIONS FOR HIGHWAY BRIDGES," H-20 AXLE LOADS OF 32,000 LB (14 515 KG).
D. CAPACITIES AND CHARACTERISTICS:

GASOLINE TANKS
1. CAPACITY: 15,000 GAL.
2. DIAMETER: 10 FEET.
3. LENGTH: 29 FEET - 2-1/2 INCHES.
4. CONNECTION SIZES:
a. FILL LINE: 4 NPS.
b. VENT LINE: 2 NPS.
5. MANHOLES:
a. NUMBER REQUIRED: 1.
b. DIAMETER: 22 INCHES.

DIESEL TANKS
6. CAPACITY: 10,000 GAL.
7. DIAMETER: 10 FEET.
8. LENGTH: 20 FEET - 11-1/2 INCHES.
9. CONNECTION SIZES:
a. FILL LINE: 4 NPS.
b. VENT LINE: 2 NPS.
10. MANHOLES:
a. NUMBER REQUIRED: 1.
b. DIAMETER: 22 INCHES.

2.8 FUEL-OIL UST ACCESSORIES
A. TANK MANHOLES: 22-INCH- (560-MM-) MINIMUM DIAMETER; BOLTED, FLANGED, AND GASKETED, WITH EXTENSION COLLAR; FOR ACCESS TO INSIDE OF TANK.
B. STRIKER PLATES: INSIDE TANK, ON BOTTOM BELOW FILL, VENT, SOUNDING, GAGE, AND OTHER TUBE OPENINGS.
C. LIFTING LUGS: FOR HANDLING AND INSTALLATION.
D. LADDERS: CARBON-STEEL LADDER INSIDE TANK, ANCHORED TO TOP AND BOTTOM. INCLUDE REINFORCEMENT OF TANK AT BOTTOM OF LADDER.
E. SUPPLY TUBE: EXTENSION OF SUPPLY PIPING FITTING INTO TANK, TERMINATING 6 INCHES (150 MM) ABOVE TANK BOTTOM AND CUT AT A 45-DEGREE ANGLE (1:1 SLOPE).
F. SOUNDING AND GAGE TUBES: EXTENSION OF FITTING INTO TANK, TERMINATING 6 INCHES (150 MM) ABOVE TANK BOTTOM AND CUT AT A 45-DEGREE ANGLE (1:1 SLOPE).
G. CONTAINMENT SUMPS: FIBERGLASS OR PE WITH SUMP BASE, ADD-ON EXTENSION PIECES AS REQUIRED, SUMP TOP, LID, AND GASKET-SEAL JOINTS. INCLUDE SUMP ENTRY BOOTS FOR PIPE PENETRATIONS THROUGH SIDEWALLS.
H. SUMP ENTRY BOOTS: TWO-PART PIPE FITTING FOR FIELD ASSEMBLY AND OF SIZE REQUIRED TO FIT OVER PIPE. INCLUDE GASKETS SHAPED TO FIT SUMP SIDEWALL, SLEEVES, SEALS, AND CLAMPS AS REQUIRED FOR LIQUID-TIGHT PIPE PENETRATIONS.
I. ANCHOR STRAPS: STORAGE TANK MANUFACTURER'S STANDARD ANCHORING SYSTEM, WITH STRAPS, STRAP-INSULATING MATERIAL, CABLES AND TURNBUCKLES, OF STRENGTH AT LEAST ONE AND ONE-HALF TIMES MAXIMUM UPLIFT FORCE OF EMPTY TANK WITHOUT BACKFILL IN PLACE.
J. FILTER MAT: GEOTEXTILE WOVEN OR SPUN FILTER FABRIC, IN 1 OR MORE LAYERS, FOR MINIMUM TOTAL WEIGHT OF 3 OZ./SQ. YD. (101.7 G/SQ. M).
K. OVERFILL PREVENTION VALVES: FACTORY FABRICATED OR SHOP OR FIELD ASSEMBLED FROM MANUFACTURER'S STANDARD COMPONENTS. INCLUDE DROP TUBE, CAP, FILL NOZZLE ADAPTOR, CHECK VALVE MECHANISM OR OTHER DEVICES, AND VENT IF REQUIRED TO RESTRICT FLOW AT 95 PERCENT OF TANK CAPACITY AND TO PROVIDE COMPLETE SHUTOFF OF FILLING AT 98 PERCENT OF TANK CAPACITY.

2.9 FUEL-OIL STORAGE TANK PIPING SPECIALTIES
A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
1. EBW, INC.
2. ENVIRON PRODUCTS, INC.
3. MORRISON BROS. CO.
4. OPW.
5. PREFERRED UTILITIES MANUFACTURING CORPORATION.
6. UNIVERSAL VALVE COMPANY.
B. FITTING MATERIALS: CAST IRON, MALLEABLE IRON, BRASS, OR CORROSION-RESISTANT METAL; SUITABLE FOR FUEL-OIL SERVICE.
1. SURFACE, FLUSH-MOUNTED FITTINGS: WATERPROOF AND SUITABLE FOR TRUCK TRAFFIC.
2. ABOVEGROUND-MOUNTED FITTINGS: WEATHERPROOF.
C. LOCKING FILL BOXES: FLUSH MOUNTING, WITH LOCKING-TYPE INNER FILL CAP FOR STANDARD PADLOCK AND THREADED FILL-PIPE CONNECTION.
D. SUPPLY AND SOUNDING DROP TUBES: FUEL-OIL SUPPLY PIPING OR FITTING, INSIDE TANK, TERMINATING 6 INCHES (150 MM) ABOVE BOTTOM OF TANK, AND WITH END CUT AT A 45-DEGREE ANGLE (1:1 SLOPE).
E. PIPE ADAPTERS AND EXTENSIONS: COMPATIBLE WITH PIPING AND FITTINGS.
F. SUCTION STRAINERS AND CHECK VALVES: BRONZE OR CORROSION-RESISTANT METAL COMPONENTS.
G. FOOT VALVES AND ANTISIPHON VALVES: POPPET-TYPE, BRONZE OR CORROSION-RESISTANT METAL COMPONENTS.
H. WEATHERPROOF VENT CAP: CAST- OR MALLEABLE-IRON INCREASER FITTING WITH CORROSION-RESISTANT WIRE SCREEN, WITH FREE AREA AT LEAST EQUAL TO CROSS-SECTIONAL AREA OF CONNECTING PIPE AND THREADED-END CONNECTION.

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I. METAL MANHOLES: 22-INCH- (560-MM-) MINIMUM DIAMETER FRAME AND COVER. FURNISH MANHOLE UNITS OF ADEQUATE SIZE FOR ACCESS TO FITTINGS IF SIZE IS NOT INDICATED.
J. MONITORING WELL CAPS: LOCKING PIPE PLUG AND MANHOLE.

2.10 FUEL-OIL TRANSFER PUMPS
A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, BASIS OF DESIGN IS:
1. FE PETRO MODEL STPMVS2-VL2.
B. DESCRIPTION: COMPLY WITH UL 343, AND HI M109.
1. LISTED AND LABELED FOR FUEL-OIL SERVICE BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
2. 2 HP,208/1/60
3. VARIABLE SPEED WITH VARIABLE SPEED CONTROLLER
4. FURNISH WITH LINE LEAK DETECTOR EQUAL TO PETRO MODEL STP-MLD-D.
C. CONTROLS:
1. RUN PUMP TO MAINTAIN MINIMUM MANIFOLD PRESSURE WITH OUTDOOR-AIR TEMPERATURE LESS THAN 60 DEG F (16 DEG C).
2. RUN PUMP ON SEVEN-DAY SCHEDULE.
3. ALARM MOTOR FAILURE.
4. MANUAL RESET DRY-RUN PROTECTION. STOP PUMP IF FUEL LEVEL FALLS BELOW PUMP SUCTION.
5. DE-ENERGIZE AND ALARM PUMP LOCKED ROTOR CONDITION.
6. ALARM OPEN CIRCUIT, HIGH AND LOW VOLTAGE.
7. INDICATING LIGHTS FOR POWER ON, RUN, AND OFF NORMAL CONDITIONS.
8. INTERFACE WITH AUTOMATIC CONTROL SYSTEM SHALL CONTROL AND INDICATE THE FOLLOWING:
a. START/STOP PUMP WHEN REQUIRED BY SCHEDULE, FUEL-FIRED APPLIANCE OPERATION, DAY TANK LEVEL CONTROL, OR WEATHER CONDITIONS.
b. OPERATING STATUS.
c. ALARM OFF-NORMAL STATUS.
E. MOTOR: COMPLY WITH NEMA DESIGNATION, TEMPERATURE RATING, SERVICE FACTOR, ENCLOSURE TYPE, AND EFFICIENCY REQUIREMENTS FOR MOTORS ACCORDING TO NEC.
1. MOTOR SIZES: MINIMUM SIZE AS INDICATED. IF NOT INDICATED, LARGE ENOUGH SO DRIVEN LOAD WILL NOT REQUIRE MOTOR TO OPERATE IN SERVICE FACTOR RANGE ABOVE 1.0.
2. CONTROLLERS, ELECTRICAL DEVICES, AND WIRING: COMPLY WITH REQUIREMENTS FOR ELECTRICAL DEVICES AND CONNECTIONS ACCORDING TO NEC

2.11 LEAK-DETECTION AND MONITORING SYSTEM
A. CABLE AND SENSOR SYSTEM: COMPLY WITH UL 1238.
1. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE EXISTING SYSTEM: VEEDER-ROOT; A DANAHER CORPORATION COMPANY.
2. VEEDER-ROOT MODEL TLS-350-R WITH INTEGRAL PRINTER, RS-232 INTERFACE, AND TIME AND DATE REPORTING.
3. CALIBRATED, LEAK-DETECTION AND MONITORING SYSTEM WITH PROBES AND OTHER SENSORS AND REMOTE ALARM PANEL FOR FUEL-OIL STORAGE TANKS AND FUEL-OIL PIPING.
4. INCLUDE FITTINGS AND DEVICES REQUIRED FOR TESTING.
5. CONTROLS: ELECTRICAL, OPERATING ON 120-V AC.
6. CALIBRATED, LIQUID-LEVEL GAGE COMPLYING WITH UL 180 WITH FLOATS OR OTHER SENSORS AND REMOTE ANNUNCIATOR PANEL.
7. REMOTE ANNUNCIATOR PANEL: WITH VISUAL AND AUDIBLE, HIGH-TANK-LEVEL AND LOW-TANK-LEVEL ALARMS, FUEL INDICATOR WITH REGISTRATION IN GALLONS (LITERS), AND OVERFILL ALARM. INCLUDE GAGE VOLUME RANGE THAT COVERS FUEL-OIL STORAGE CAPACITY.
8. CONTROLS: ELECTRICAL, OPERATING ON 120-V AC.

2.12 FUEL DISPENSERS
A. FURNISH AND INSTALL TWO (2) DUAL HOSE, DIESEL PRODUCT, ISLAND DISPENSERS EQUAL TO DRESSER WAYNE MODEL NO. 3/G7232D/GHJK/VW3. UNITS SHALL OPERATE ON 120/1/60.
B. FURNISH AND INSTALL FOUR (4) DUAL HOSE , DUAL PRODUCT, ISLAND DISPENSERS EQUAL TO DRESSER WAYNE MODEL NO. 3/G7232D/GHJK/VW3. UNITS SHALL OPERATE ON 120/1/60.
C. FURNISH AND INSTALL TWO (2) DUAL HOSE, GASOLINE PRODUCT, ISLAND DISPENSERS EQUAL TO DRESSER WAYNE MODEL NO. 3/G7232D/GHJK/VW3. UNITS SHALL OPERATE ON 120/1/60.

2.13 LABELING AND IDENTIFYING
A. DETECTABLE WARNING TAPE: ACID- AND ALKALI-RESISTANT, PE FILM WARNING TAPE MANUFACTURED FOR MARKING AND IDENTIFYING UNDERGROUND UTILITIES, A MINIMUM OF 6 INCHES (152 MM) WIDE AND 4 MILS (0.1 MM) THICK, CONTINUOUSLY INSCRIBED WITH A DESCRIPTION OF UTILITY, WITH METALLIC CORE ENCASED IN A PROTECTIVE JACKET FOR CORROSION PROTECTION, DETECTABLE BY METAL DETECTOR WHEN TAPE IS BURIED UP TO 30 INCHES (762 MM) DEEP; COLORED YELLOW.

2.14 SOURCE QUALITY CONTROL
A. PRESSURE TEST AND INSPECT FUEL-OIL STORAGE TANKS, AFTER FABRICATION AND BEFORE SHIPMENT, ACCORDING TO ASME AND UL 1316.
B. AFFIX STANDARDS ORGANIZATION'S CODE STAMP.

PART 3 - EXECUTION

3.1 EARTHWORK
A. COMPLY WITH REQUIREMENTS IN DIVISION 31 SECTION "EARTH MOVING" FOR EXCAVATING, TRENCHING, AND BACKFILLING.

3.2 OUTDOOR PIPING INSTALLATION
A. INSTALL UNDERGROUND FUEL-OIL PIPING BURIED AT LEAST 18 INCHES (457 MM) BELOW FINISHED GRADE.
B. INSTALL DOUBLE-CONTAINMENT, FUEL-OIL PIPE AT A MINIMUM SLOPE OF 1 PERCENT DOWNWARD TOWARD FUEL-OIL STORAGE TANK SUMP.
C. ASSEMBLE AND INSTALL ENTRY BOOTS FOR PIPE PENETRATIONS THROUGH SUMP SIDEWALLS FOR LIQUID-TIGHT JOINTS.
D. INSTALL METAL PIPES AND TUBES, FITTINGS, AND VALVES AT PIPING CONNECTIONS TO UST.
E. INSTALL FITTINGS FOR CHANGES IN DIRECTION IN RIGID PIPE.
F. INSTALL SYSTEM COMPONENTS WITH PRESSURE RATING EQUAL TO OR GREATER THAN SYSTEM OPERATING PRESSURE.
G. INSTALL PRESSURE GAGE ON SUCTION AND DISCHARGE FROM EACH PUMP.

3.3 VALVE INSTALLATION
A. INSTALL MANUAL FUEL-OIL SHUTOFF VALVES ON BRANCH CONNECTIONS TO FUEL-OIL APPLIANCE.
B. INSTALL VALVES IN ACCESSIBLE LOCATIONS.
C. PROTECT VALVES FROM PHYSICAL DAMAGE.
D. INSTALL METAL TAG ATTACHED WITH METAL CHAIN INDICATING FUEL-OIL PIPING SYSTEMS.
E. IDENTIFY VALVES FOR ALL PIPING AND EQUIPMENT."
F. INSTALL OIL SAFETY VALVES AT INLET OF EACH OIL-FIRED APPLIANCE.
G. INSTALL PRESSURE RELIEF VALVES IN DISTRIBUTION PIPING BETWEEN THE SUPPLY AND RETURN LINES.
H. INSTALL ONE-PIECE, BRONZE BALL VALVE WITH HOSE END CONNECTION AT LOW POINTS IN FUEL-OIL PIPING.
I. INSTALL MANUAL AIR VENTS AT HIGH POINTS IN FUEL-OIL PIPING.

3.4 PIPING JOINT CONSTRUCTION
A. REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS.
B. REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPE AND FITTINGS BEFORE ASSEMBLY.
C. THREADED JOINTS: THREAD PIPE WITH TAPERED PIPE THREADS ACCORDING TO ASME B1.20.1. CUT THREADS FULL AND CLEAN USING SHARP DIES. REAM THREADED PIPE ENDS TO REMOVE BURRS AND RESTORE FULL ID. JOIN PIPE FITTINGS AND VALVES AS FOLLOWS:
1. APPLY APPROPRIATE TAPE OR THREAD COMPOUND TO EXTERNAL PIPE THREADS UNLESS DRY SEAL THREADING IS SPECIFIED.
2. DAMAGED THREADS: DO NOT USE PIPE OR PIPE FITTINGS WITH THREADS THAT ARE CORRODED OR DAMAGED. DO NOT USE PIPE SECTIONS THAT HAVE CRACKED OR OPEN WELDS.
D. WELDED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS D10.12/D10.12M, USING QUALIFIED PROCESSES AND WELDING OPERATORS ACCORDING TO "QUALITY ASSURANCE" ARTICLE.
1. BEVEL PLAIN ENDS OF STEEL PIPE.
2. PATCH FACTORY-APPLIED PROTECTIVE COATING AS RECOMMENDED BY MANUFACTURER AT FIELD WELDS AND WHERE DAMAGE TO COATING OCCURS DURING CONSTRUCTION.
E. BRAZED JOINTS: CONSTRUCT JOINTS ACCORDING TO AWS'S "BRAZING HANDBOOK," "PIPE AND TUBE" CHAPTER.
F. FLARED JOINTS: COMPLY WITH SAE J513. TIGHTEN FINGER TIGHT, THEN USE WRENCH ACCORDING TO FITTING MANUFACTURER'S WRITTEN RECOMMENDATIONS. DO NOT OVERTIGHTEN.

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3.5 FUEL-OIL UST INSTALLATION
A. EXCAVATE TO SUFFICIENT DEPTH FOR A MINIMUM OF 3 FEET (1 M) OF EARTH COVER FROM TOP OF TANK TO FINISHED GRADE. ALLOW FOR CAST-IN-PLACE, CONCRETE-BALLAST BASE PLUS 6 INCHES (150 MM) OF SAND OR PEA GRAVEL BETWEEN BALLAST BASE AND TANK. EXTEND EXCAVATION AT LEAST 12 INCHES (300 MM) AROUND PERIMETER OF TANK.
B. SET TIE-DOWN EYELETS FOR HOLD-DOWN STRAPS IN CONCRETE-BALLAST BASE AND TIE TO REINFORCING STEEL.
C. PLACE 6 INCHES (152 MM) OF CLEAN SAND OR PEA GRAVEL ON TOP OF CONCRETE-BALLAST BASE.
D. SET TANK ON FILL MATERIALS AND INSTALL HOLD-DOWN STRAPS.
E. CONNECT PIPING.
F. INSTALL TANK LEAK-DETECTION AND MONITORING DEVICES.
G. INSTALL CONTAINMENT SUMPS.
H. BACKFILL EXCAVATION WITH CLEAN SAND OR PEA GRAVEL IN 12-INCH (305-MM) LIFTS AND TAMP BACKFILL LIFT TO CONSOLIDATE.
I. INSTALL FILTER MAT BETWEEN TOP OF BACKFILL MATERIAL AND EARTH FILL.
J. INSTALL FRP USTS WITH FRP HOLD-DOWN STRAPS, MANHOLE EXTENSIONS, AND MANHOLE RISERS.

3.6 HANGER AND SUPPORT INSTALLATION
A. INSTALL HANGERS FOR HORIZONTAL STEEL PIPING WITH THE FOLLOWING MAXIMUM SPACING AND MINIMUM ROD SIZES:
1. NPS 1-1/4 (DN 32) AND SMALLER: MAXIMUM SPAN, 84 INCHES (2130 MM); MINIMUM ROD SIZE, 3/8 INCH (10 MM).
2. NPS 1-1/2 (DN 40): MAXIMUM SPAN, 108 INCHES (2740 MM); MINIMUM ROD SIZE, 3/8 INCH (10 MM).
3. NPS 2 (DN 50): MAXIMUM SPAN, 10 FEET (3 M); MINIMUM ROD SIZE, 3/8 INCH (10 MM).
B. SUPPORT VERTICAL STEEL PIPE AT EACH FLOOR AND AT SPACING NOT GREATER THAN 15 FEET (4.5 M).
C. SUPPORT VERTICAL COPPER TUBE AT EACH FLOOR AND AT SPACING NOT GREATER THAN 10 FEET (3 M).

3.7 FUEL-OIL PUMP INSTALLATION
A. TRANSFER PUMPS:
1. INSTALL PUMPS WITH ACCESS SPACE FOR PERIODIC MAINTENANCE INCLUDING REMOVAL OF MOTORS, IMPELLERS, AND ACCESSORIES.
2. SET PUMPS ON AND ANCHOR TO CONCRETE BASE.
B. INSTALL TWO-PIECE, FULL-PORT BALL VALVES AT SUCTION AND DISCHARGE OF PUMPS.
C. INSTALL STRAINER ON INLET SIDE OF SIMPLEX FUEL-OIL PUMPS.
D. INSTALL CHECK VALVE ON DISCHARGE OF SIMPLEX FUEL-OIL PUMPS.
E. INSTALL SUCTION PIPING WITH MINIMUM FITTINGS AND CHANGE OF DIRECTION.
F. INSTALL VACUUM AND PRESSURE GAGE, UPSTREAM AND DOWNSTREAM RESPECTIVELY, AT EACH PUMP TO MEASURE THE DIFFERENTIAL PRESSURE ACROSS THE PUMP.

3.8 LEAK-DETECTION AND MONITORING SYSTEM INSTALLATION
A. INSTALL LEAK-DETECTION AND MONITORING SYSTEM. INSTALL ALARM PANEL INSIDE BUILDING WHERE INDICATED.
1. DOUBLE-WALL, FUEL-OIL STORAGE TANKS: USE FACTORY-INSTALLED INTEGRAL PROBES IN INTERSTITIAL SPACE.
2. INSTALL LIQUID-LEVEL GAGE.

3.9 CONNECTIONS
A. INSTALL PIPING ADJACENT TO EQUIPMENT TO ALLOW SERVICE AND MAINTENANCE.
B. INSTALL UNIONS, IN PIPING NPS 2 (DN 50) AND SMALLER, ADJACENT TO EACH VALVE AND AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT HAVING THREADED PIPE CONNECTION.
C. CONNECT PIPING TO EQUIPMENT WITH BALL VALVE AND UNION. INSTALL UNION BETWEEN VALVE AND EQUIPMENT.
D. INSTALL FLEXIBLE PIPING CONNECTORS AT FINAL CONNECTION TO BURNERS OR OIL-FIRED APPLIANCES THAT MUST BE MOVED FOR MAINTENANCE ACCESS.

3.10 LABELING AND IDENTIFYING
A. PROVIDE NAMEPLATES, PIPE IDENTIFICATION, AND SIGNS.
B. INSTALL DETECTABLE WARNING TAPE DIRECTLY ABOVE FUEL-OIL PIPING, 12 INCHES (304 MM) BELOW FINISHED GRADE, EXCEPT 6 INCHES (152 MM) BELOW SUBGRADE UNDER PAVEMENTS AND SLABS. TERMINATE TRACER WIRE IN AN ACCESSIBLE AREA, AND IDENTIFY AS "TRACER WIRE" FOR FUTURE USE WITH PLASTIC-LAMINATE SIGN.
1. PIPING: OVER UNDERGROUND FUEL-OIL DISTRIBUTION PIPING.
2. FUEL-OIL STORAGE TANKS: OVER EDGES OF EACH UST.

3.11 CONCRETE BASES
A. CONCRETE BASES: ANCHOR EQUIPMENT TO CONCRETE BASE ACCORDING TO EQUIPMENT MANUFACTURER'S WRITTEN INSTRUCTIONS AND ACCORDING TO SEISMIC CODES AT PROJECT.
1. CONSTRUCT CONCRETE BASES OF DIMENSIONS INDICATED, BUT NOT LESS THAN 4 INCHES (100 MM) LARGER IN BOTH DIRECTIONS THAN SUPPORTED UNIT.
2. INSTALL DOWEL RODS TO CONNECT CONCRETE BASE TO CONCRETE FLOOR. UNLESS OTHERWISE INDICATED, INSTALL DOWEL RODS ON 12-INCH CENTERS AROUND THE FULL PERIMETER OF THE BASE.
3. INSTALL EPOXY-COATED ANCHOR BOLTS FOR SUPPORTED EQUIPMENT THAT EXTEND THROUGH CONCRETE BASE, AND ANCHOR INTO STRUCTURAL CONCRETE FLOOR.
4. PLACE AND SECURE ANCHORAGE DEVICES. USE SUPPORTED EQUIPMENT MANUFACTURER'S SETTING DRAWINGS, TEMPLATES, DIAGRAMS, INSTRUCTIONS, AND DIRECTIONS FURNISHED WITH ITEMS TO BE EMBEDDED.
5. INSTALL ANCHOR BOLTS TO ELEVATIONS REQUIRED FOR PROPER ATTACHMENT TO SUPPORTED EQUIPMENT.
6. USE 3000-PSIG (20.7-MPA), 28-DAY, COMPRESSIVE-STRENGTH CONCRETE AND REINFORCEMENT.

3.12 FIELD QUALITY CONTROL
A. TANKS: MINIMUM HYDROSTATIC OR COMPRESSED-AIR TEST PRESSURES FOR FUEL-OIL STORAGE TANKS THAT HAVE NOT BEEN FACTORY TESTED AND DO NOT BEAR THE ASME CODE STAMP OR A LISTING MARK ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION:
1. INNER TANKS: MINIMUM 3 PSIG (20.7 KPA) AND MAXIMUM 5 PSIG (34.5 KPA).
2. INTERSTITIAL SPACE: MINIMUM 3 PSIG (20.7 KPA) AND MAXIMUM 5 PSIG (34.5 KPA), OR 5.3-IN. HG (18-KPA) VACUUM.
3. WHERE VERTICAL HEIGHT OF FILL AND VENT PIPES IS SUCH THAT THE STATIC HEAD IMPOSED ON THE BOTTOM OF THE TANK IS GREATER THAN 10 PSIG (69 KPA), HYDROSTATICALLY TEST THE TANK AND FILL AND VENT PIPES TO A PRESSURE EQUAL TO THE STATIC HEAD THUS IMPOSED.
4. MAINTAIN THE TEST PRESSURE FOR ONE HOUR.
B. PIPING: MINIMUM HYDROSTATIC OR PNEUMATIC TEST-PRESSURES MEASURED AT HIGHEST POINT IN SYSTEM:
1. FUEL-OIL DISTRIBUTION PIPING: MINIMUM 5 PSIG (34.5 KPA) FOR MINIMUM 30 MINUTES.
2. FUEL-OIL, DOUBLE-CONTAINMENT PIPING:
a. CARRIER PIPE: MINIMUM 5 PSIG (34.5 KPA) FOR MINIMUM 30 MINUTES.
b. CONTAINMENT CONDUIT: MINIMUM 5 PSIG (34.5 KPA) FOR MINIMUM 60 MINUTES.
3. SUCTION PIPING: MINIMUM 20-IN. HG (68 KPA) FOR MINIMUM 30 MINUTES.
4. ISOLATE STORAGE TANKS IF TEST PRESSURE IN PIPING WILL CAUSE PRESSURE IN STORAGE TANKS TO EXCEED 10 PSIG (69 KPA).
C. INSPECT AND TEST FUEL-OIL PIPING ACCORDING TO NFPA 31, "TESTS OF PIPING" PARAGRAPH; AND ACCORDING TO REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.
D. TEST LIQUID-LEVEL GAGE FOR ACCURACY BY MANUALLY MEASURING FUEL-OIL LEVELS AT NOT LESS THAN FOUR DIFFERENT DEPTHS WHILE FILLING TANK AND CHECKING AGAINST GAGE INDICATION.
E. TEST LEAK-DETECTION AND MONITORING SYSTEM FOR ACCURACY BY MANUALLY OPERATING SENSORS AND CHECKING AGAINST ALARM PANEL INDICATION.
F. START FUEL-OIL TRANSFER PUMPS TO VERIFY FOR PROPER OPERATION OF PUMP AND CHECK FOR LEAKS.
G. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.
H. BLEED AIR FROM FUEL-OIL PIPING USING MANUAL AIR VENTS.
I. FUEL-OIL PIPING AND EQUIPMENT WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.
J. PREPARE TEST AND INSPECTION REPORTS.

3.13 OUTDOOR PIPING SCHEDULE
A. UNDERGROUND FUEL-OIL PIPING: FLEXIBLE, DOUBLE-CONTAINMENT PIPING; SIZE INDICATED IS CARRIER-PIPE SIZE.
B. UNDERGROUND FUEL-OIL-TANK FILL AND VENT PIPING: STEEL PIPE, STEEL OR MALLEABLE-IRON THREADED FITTINGS, AND THREADED JOINTS. COAT PIPE AND FITTINGS WITH PROTECTIVE COATING FOR STEEL PIPING.
C. CONTAINMENT CONDUIT: STEEL PIPE WITH WROUGHT-STEEL FITTINGS AND WELDED JOINTS. COAT PIPE AND FITTINGS WITH PROTECTIVE COATING FOR STEEL PIPING.
D. ABOVEGROUND FUEL-OIL PIPING SHALL BE THE FOLLOWING:
1. STEEL PIPE, STEEL OR MALLEABLE-IRON THREADED FITTINGS, AND THREADED JOINTS.

3.14 ABOVEGROUND MANUAL FUEL-OIL SHUTOFF VALVE SCHEDULE
RETAIN AND REVISE APPLICABLE PIPING APPLICATIONS. COORDINATE WITH MATERIALS SPECIFIED IN PART 2.
A. DISTRIBUTION PIPING VALVES FOR PIPE NPS 2 (DN 50) AND SMALLER SHALL BE ONE OF THE FOLLOWING:
1. TWO-PIECE, FULL-PORT, BRONZE BALL VALVES WITH BRONZE TRIM.
B. VALVES IN BRANCH PIPING FOR SINGLE APPLIANCE SHALL BE ONE OF THE FOLLOWING:
1. TWO-PIECE, FULL-PORT, BRONZE BALL VALVES WITH BRONZE TRIM.

END OF SECTION 231113

Mark	Date	Description

REVISIONS:
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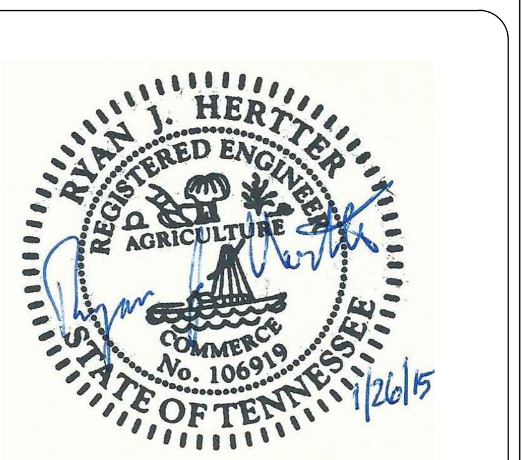

PROJECT NAME
TANK REPLACEMENT AT HALEY ROAD
SHELBY COUNTY GOVERNMENT
6411 HALEY ROAD
MEMPHIS, TENNESSEE

DRAWING NAME
SPECIFICATIONS

Hertter Mechanical Services
Ryan J. Hertter, P.E., LEED AP
4700 WILD FERN DR
Bartlett, TN 38135
(901) 827-8016

DATE	01/14/15
SCALE	NTS
DRAWN BY	PH
DESIGNED BY	RJH
CHECKED BY	RJH

SHEET NO.
M4.1

SECTION 024119
SELECTIVE SITE DEMOLITION

PART 1 - GENERAL
1.1 SUMMARY
A. section includes products and operations required to achieve selective demolition of surface and subsurface structures, equipment, and utilities associated with the function of underground storage tanks (usts). the contractor shall be ever mindful of the particular hazards associated with such operations, and take all appropriate safety precautions.
B. demolition shall not extend beyond the "property lines" or project limit lines except where specifically called for on the drawings. any damage to existing facilities to remain (including sidewalks, curbs, pavement, utilities, adjacent property, etc.) shall be repaired or replaced in accordance with authority having jurisdiction requirements or regulations at no additional cost(s) to the owner. the contractor shall secure all necessary permits, inspections, approvals, and pay all fees required for the project.
C. project/site conditions: contractor shall receive structures, equipment, and utilities identified for demolition "as is" from owner and shall have all salvage rights except those expressly reserved for owner by contract documents.
D. comply with applicable federal, state and local laws and regulations concerning environmental pollution control and abatement.
E. perform all demolition work in accordance with OSHA requirements and asni/nfpa 241-1975 "safeguarding building construction and demolition operations."
1.2 RELATED WORK
Related work is specified in the following sections:
A. Section 026500 - underground storage tank removal
B. Section 312319 - dewatering
C. Section 312000 - excavation, backfilling, and grading
1.3 REQUIREMENTS OF REGULATORY AGENCIES
A. Proper permits shall be obtained from the building department or departments having jurisdiction over the subject removal/demolition.
B. Obtain certificate of severance of utility services as may be required.
C. Obtain proper permits for the transport and legal disposal of all debris.
1.4 SUBMITTALS
A. Submit proposed schedule of demolition activities. indicate:
1. Starting and ending dates for each activity as appropriate.
2. Time of shutoff, capping and continuation of utility services.
B. Submit proposed methods of operation.
C. Before starting work, file with the engineer photographs documenting existing conditions
which could be misconstrued as damage resulting from demolition operations.
D. Project record documents
1. Identify location of capped utilities.
2. Indicate unanticipated structural, electrical and mechanical conditions.
1.5 CLOSEOUT SUBMITTALS
A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
1.6 FIELD CONDITIONS AND PROTECTION
A. Adjacent structures will not be vacated during demolition operations, and will maintain day-to-day business operations.
B. Coordinate demolition operations and procedures in a manner that will permit day-to-day operations, and protect pedestrians and personnel during all demolition operations.
C. Erect barrier fences, guard rails, enclosures, and shoring to protect personnel, structures, and utilities that are to remain intact.
D. Protect surrounding structures from any possible damage.
E. Unanticipated conditions: if unanticipated mechanical, electrical, or structural elements which conflict with intended function or design are encountered, investigate and measure both the nature and extent of the conflict. submit report to the engineer in written, accurate detail. pending direction from the engineer, rearrange demolition schedule as necessary to continue overall job progress without delay.
PART 2 - PRODUCTS
2.1 PEFORMANCE REQUIREMENTS
A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.
2.2 MAINTAINING TRAFFIC
A. Ensure minimum interference with roads, streets, driveways, sidewalks and adjacent facilities.
B. Do not close or obstruct streets, walks, or other facilities without written permission from authorities having jurisdiction.
2.3 SECURITY
A. Provide security program and facilities to protect work, existing facilities, and owner's operations from unauthorized entry, vandalism and theft. protect site and equipment against unauthorized entry.
B. Prohibit access to site before and after working hours.
2.4 DUST CONTROL
A. Execute work by methods to minimize raising dust from construction operations. provide positive means to prevent airborne dust from dispersing into atmosphere.
B. Do not use oils, bitumens, or chloride for dust control.
2.5 EROSION AND SEDIMENT CONTROL
A. Minimize amount of bare soil exposed at one time.
B. Plan and execute construction by methods to control surface drainage from cuts and waste disposal areas. prevent erosion and sedimentation.
C. Conduct operations to avoid washing or deposition of materials into waterways or off-site.
D. Do not track or spill mud, clay, gravel, or other materials into adjacent streets or off-site. clean up inadvertent tracking and spills immediately (same day).
E. Periodically inspect earthwork and/or site to detect evidence of erosion and sedimentation; promptly apply corrective measures.
2.6 POLLUTION CONTROL
A. Provide methods, means, and facilities to prevent contamination of soil and water from discharge of noxious, toxic substances and pollutants produced by construction operations.
2.7 CLEANING DURING CONSTRUCTION
A. Control accumulation of waste materials and rubbish and maintain site in a clean and orderly condition.
2.8 WATER CONTROL
A. Control surface water and ground water during construction.
B. Rough grade site to prevent standing water and to direct surface drainage away from work area. construct diversion berms or provide piping to direct surface water and rain water away from excavation work area, including diversion of building downspouts.
C. Maintain or relocate existing ditches and spillways.
D. Stockpile material such that it does not restrict surface drainage.
E. If it is necessary to interrupt existing surface drainage, provide and maintain temporary piping or ditching until permanent drainage is available.
F. Maintain excavations and trenches free of water. provide and operate pumping equipment of a capacity to control water flow.
PART 3 - EXECUTION
3.1 EXAMINATION AND PREPARATION
A. Protect adjacent properties and ensure safety of the public from dangers associated with work.
B. Prior to demolition, inspect area of demolition work to ascertain that safety precautions have been taken, and that structures and site area are clear and ready for demolition.
C. Take every precaution to reduce dust and prevent damage to adjacent fencing, sidewalks, and paving.
D. Arrange for and verify the relocation of utility services to include necessary removal of meters and capping of lines, as required.
E. Verify items to be salvaged for the owner and establish location of storage.
F. Insofar as is practicable, arrange operations to reveal unknown or concealed conditions for examination and verification before removal or demolition.
G. Verify actual conditions to determine in advance whether removal or demolition of any element will result in failure or unplanned collapse.
H. Perform continuing surveys as the work progresses to detect hazards resulting from demolition or construction activities.
I. Damages: promptly repair, at no cost to the owner, damages caused to facilities to remain.

3.2 DEMOLITION
A. Restrictions
1. Do no use explosives.
2. Do not use water when it may create hazardous or objectionable conditions such as ice, erosion, flooding, and pollution.
3. If during demolition procedures the contractor identifies concealed hazardous materials, the contractor is to notify the engineer immediately.
B. Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent facilities.
C. Proceed with demolition in a systematic manner from the top of the structure to the ground. use such methods as are required to complete the work within the limitations of governing regulations.
D. Cut and patch adjoining structures and finishes to remain, as required; so they are in sound, stable, and aesthetic condition.
E. Remove all debris, rubbish and other material from site and dispose of in an appropriate sanitary landfill off-site.
F. Upon completion of the demolition operation, leave site in a suitable condition for excavation, backfilling, and grading operations as specified in section 312000.
3.3 UTILITY SERVICES
A. Arrange with utility companies and shut off indicated utilities.
B. Disconnect and cap indicated utilities before starting demolition operations.
C. Identify locations of capped utilities on project record documents.
D. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the engineer.
E. Provide at least 48 hours advance notice to the engineer if interruptions of service is necessary during changeover.
3.4 SALVAGE AND DEBRIS
A. Limit storage for salvage material to immediate area of work and other areas as may be designated by the engineer.
B. Remove debris daily from site to an appropriate dump. do not burn trash on site. do not allow daily accumulation of trash and debris to obstruct roads, walks, or other points of access which are outside contractor's exclusive area of use.
C. Coordinate with the engineer salvage materials to be delivered to the owner. contractor shall remove, disassemble and package salvage items. owner will receive salvage items at project site.
3.5 DISPOSAL OF DEMOLISHED MATERIALS
A. Promptly dispose of materials resulting from demolition operations. do not allow materials to accumulate on site.
B. Transport materials resulting from demolition operations and legally dispose of offsite.
C. Do not burn removed materials on project site.
D. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
3.6 CLEANING
A. Upon completion of demolition work, remove tools and equipment and dispose of scrap.
B. Return structures, fence and surfaces to remain to condition exiting prior to commencement of demolition.
END OF SECTION 024119

SECTION 031050
CONCRETE CUTTING AND REMOVAL

PART 1 - GENERAL
1.1 SURFACE PREPARATION
A. DESCRIPTION: This item shall consist of removal of existing concrete. the work shall be accomplished in accordance with these specifications and the applicable drawings.
B. EQUIPMENT: All equipment shall be specified hereinafter or as approved by the engineer. the equipment shall not cause damage to the pavement to remain in place.
PART 2 - CONSTRUCTION
2.1 REMOVAL OF EXISTING PAVEMENT
A. The existing concrete to be removed shall be freed from the pavement or concrete to remain unless jackhammers are used for the complete removal. this shall be accomplished by line drilling or sawing through the complete depth of the slab one foot inside the perimeter of the final removal limits or outside the load transfer devices, whichever is greater. in this case, the limits of removal would be located on joints. if line drilling is used, the distance between holes shall not exceed the diameter of the hole. the pavement between the perimeter of the pavement removal and the saw cut or line-drilled holes shall be removed with a jackhammer. where the perimeter of the removal limits is not located on the joint, the perimeter shall be saw cut full depth. again, the concrete shall be line drilled or saw cut the full depth of the pavement 6 inches inside the removal limits. the pavement inside the saw cut or line shall be broken by methods suitable to the contractor. the contractor's removal operation shall not cause damage to cables, utility ducts, pipelines, or drainage structures under the pavement. any damage shall be repaired by the contractor at no expense to the owner.
2.2 METHOD OF MEASUREMENT
A. GENERAL: If there is no quantity shown in the bidding schedule, the work covered by this section shall be considered as a subsidiary obligation of the contractor covered under the other contract items. only accepted work will be measured.
B. CONCRETE REMOVAL: The unit of measurement for concrete removal shall be the number of square feet removed by the contractor. any concrete removed outside the limits of removal because the concrete was damaged by negligence on the part of the contractor shall not be included in the measurement for payment.
PART 3 - BASIS OF PAYMENT
3.1 PAYMENT
A. Payment shall be made at contract unit price for the unit of measurement as specified hereinbefore. this price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.
B. payment will be made under: concrete removal - per square foot
END SECTION 031050

SECTION 312000
EARTH MOVING

PART 1 - GENERAL
1.1 SUMMARY
A. SECTION INCLUDES:
1. Preparing subgrades for pavements, turf and grasses.
2. Subbase course for concrete pavements.
3. Excavating and backfilling for utility trenches.
1.2 DEFINITIONS
A. BACKFILL: Soil material used to fill an excavation.
1. INITIAL BACKFILL: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. FINAL BACKFILL: Backfill placed over initial backfill to fill a trench.
B. BASE COURSE: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
C. BEDDING COURSE: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
D. BORROW SOIL: Satisfactory soil imported from off-site for use as fill or backfill.
E. EXCAVATION: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
1. Authorized additional excavation: excavation below subgrade elevations or beyond indicated lines and dimensions as directed by architect. authorized additional excavation and replacement material will be paid for according to contract provisions for changes in the work.
2. UNAUTHORIZED EXCAVATION: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by architect. unauthorized excavation, as well as remedial work directed by architect, shall be without additional compensation.
G. FILL: Soil materials used to raise existing grades.
H. SUBBASE COURSE: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
I. SUBGRADE: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
J. UTILITIES: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
1.3 QUALITY ASSURANCE
A. PRE-EXCAVATION CONFERENCE: Conduct conference at project site.
PART 2 - PRODUCTS
2.1 SOIL MATERIALS
A. GENERAL: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
B. SATISFACTORY SOILS: Soil classification groups gw, gp, gm, sw, sp, and sm according to astm d 2487, or a combination of these groups; free of rock or gravel larger than 3 inches (75 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
C. UNSATISFACTORY SOILS: Soil classification groups gc, sc, cl, ml, ol, ch, mh, oh, and pt according to astm d 2487, or a combination of these groups.
1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
D. SUBBASE MATERIAL: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; astm d 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a no. 200 (0.075-mm) sieve.
E. BASE COURSE: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; astm d 2940; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a no. 200 (0.075-mm) sieve.
F. ENGINEERED FILL: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; astm d 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a no. 200 (0.075-mm) sieve.
G. BEDDING COURSE: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; astm d 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a no. 200 (0.075-mm) sieve.
2.2 ACCESSORIES
A. DETECTABLE WARNING TAPE: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored to comply with local practice or requirements of authorities having jurisdiction.
PART 3 - EXECUTION
3.1 PREPARATION
A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
B. Protect and maintain erosion and sedimentation controls during earth moving operations.
C. Protect subgrades and foundation soils from freezing temperatures and frost. remove temporary protection before placing subsequent materials.
3.2 EXCAVATION, GENERAL
A. UNCLASSIFIED EXCAVATION: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. unclassified excavated materials may include rock, soil materials, and obstructions. no changes in the contract sum or the contract time will be authorized for rock excavation or removal of obstructions.
1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
3.3 EXCAVATION FOR WALKS AND PAVEMENTS
A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.
3.4 EXCAVATION FOR UTILITY TRENCHES
A. Excavate trenches to indicated gradients, lines, depths, and elevations.
B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit unless otherwise indicated.
1. CLEARANCE: 12 Inches (300 mm) each side of pipe or conduit.
C. TRENCH BOTTOMS: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. remove projecting stones and sharp objects along trench subgrade.
1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material, 4 inches (100 mm) deeper elsewhere, to allow for bedding course.
3.5 SUBGRADE INSPECTION
A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. do not proof-roll wet or saturated subgrades.
B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by architect, without additional compensation.
3.6 UNAUTHORIZED EXCAVATION
A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 mpa), may be used when approved by architect.
1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by engineer.
3.7 STORAGE OF SOIL MATERIALS
A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. place, grade, and shape stockpiles to drain surface water. cover to prevent windblown dust.
1. Stockpile soil materials away from edge of excavations. do not store within drip line of remaining trees.
3.8 UTILITY TRENCH BACKFILL
A. Place backfill on subgrades free of mud, frost, snow, or ice.
B. Place and compact bedding course on trench bottoms and where indicated. shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
C. Place and compact initial backfill of subbase material, free of particles larger than 2 inch (50 mm) in any dimension, to a height of 12 inches (300 mm) over the pipe or conduit.
1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. coordinate backfilling with utilities testing.
D. Place and compact final backfill of satisfactory soil to final subgrade elevation.
E. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.
3.9 SOIL FILL
A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
B. Place and compact fill material in layers to required elevations as follows:
1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3.10 SOIL MOISTURE CONTROL
A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
3.11 COMPACTION OF SOIL BACKFILLS AND FILLS
A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
B. Compact soil materials to not less than the following percentages of maximum dry unit weight according to astm d 698:
1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under turf or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill soil material at 85 percent.
3. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.
3.12 GRADING
A. GENERAL: Uniformly grade areas to a smooth surface, free of irregular surface changes. comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
B. SITE ROUGH GRADING: Slope grades to direct water away from buildings and to prevent ponding. finish subgrades to required elevations within the following tolerances:
1. Turf or unpaved areas: plus or minus 1 inch (25 mm).
2. PAVEMENTS: Plus or minus 1/2 inch (13 mm).
3.13 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS
A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
1. Shape subbase course and base course to required crown elevations and cross-slope grades.
2. Place subbase course and base course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
3. Compact subbase cours[and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to astm d 698.
3.14 FIELD QUALITY CONTROL
A. FOOTING SUBGRADE: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by engineer.
3.15 PROTECTION
A. Protecting graded areas: protect newly graded areas from traffic, freezing, and erosion. keep free of trash and debris.
B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
C. Where settling occurs before project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.
3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS
A. Stockpile surplus satisfactory soil on owner's property.
B. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off owner's property.
END OF SECTION 312000

SECTION 312319
DEWATERING

PART 1 - GENERAL
1.1 SUMMARY
A. Section includes construction dewatering.
1.2 PERFORMANCE REQUIREMENTS
A. Dewatering performance: design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
1.3 SUBMITTALS
A. Shop drawings: for dewatering system. show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, discharge lines, piezometers, and flow-measuring devices; and means of discharge, control of sediment, and disposal of water.
B. Delegated-design submittal: for dewatering system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1.4 QUALITY ASSURANCE
A. Regulatory requirements: comply with governing epa notification regulations before beginning dewatering. comply with hauling and disposal regulations of authorities having jurisdiction.
B. Preinstallation conference: conduct conference at project site.
1.5 PROJECT CONDITIONS
A. Survey work: engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. clearly identify benchmarks and record existing elevations.
1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. promptly notify architect if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.
PART 2 - PRODUCTS (NOT USED)
PART 3 - EXECUTION
3.1 INSTALLATION
A. Provide temporary grading to facilitate dewatering and control of surface water.
B. Monitor dewatering systems continuously.
C. Protect and maintain temporary erosion and sedimentation controls during dewatering operations.
D. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
E. Before excavating below ground-water level, place system into operation to lower water to specified levels. operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
F. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
G. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
1. Maintain piezometric water level a minimum of 24 inches (600 mm) below surface of excavation.
H. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. if dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to owner.
1. Remove dewatering system from project site on completion of dewatering. plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches (900 mm) below overlying construction.
END OF SECTION 312319

SECTION 321313
CONCRETE PAVING

PART 1 - GENERAL
1.1 SUMMARY
A. Section Includes:
1. Driveways.
2. Roadways.
3. Parking lots.
4. Curbs and gutters.
5. Walks.
1.2 ACTION SUBMITTALS
A. Product Data: For each type of product indicated.
1.3 QUALITY ASSURANCE
A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
B. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.
PART 2 - PRODUCTS
2.1 STEEL REINFORCEMENT
A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.
C. Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain-steel bars. Cut bars true to length with ends square and free of burrs.
D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.
2.2 CONCRETE MATERIALS
A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
1. Portland Cement: ASTM C 150, white portland cement Type I Supplement with the following:
a. Fly Ash: ASTM C 618, Class C or Class F.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
B. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source.
C. Water: Potable and complying with ASTM C 94/C 94M.
D. Air-Entraining Admixture: ASTM C 260.
E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
2.3 CURING MATERIALS
A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
C. Water: Potable.
D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
2.4 RELATED MATERIALS
A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.
2.5 CONCRETE MIXTURES
A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), with the following properties:
1. Compressive Strength (28 Days): 4000 psi (27.6 MPa).
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.48.
3. Slump Limit: 3 inches, plus or minus 1 inch (25 mm).
4. Air Content: 4-1/2 percent plus or minus 1.5 percent.
B. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
2.6 CONCRETE MIXING
A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.
PART 3 - EXECUTION
3.1 EXAMINATION AND PREPARATION
A. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
B. Remove loose material from compacted subbase surface immediately before placing concrete.
3.2 EDGE FORMS AND SCREED CONSTRUCTION
A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.
3.3 STEEL REINFORCEMENT
A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
3.4 JOINTS
A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, to match jointing of existing adjacent concrete paving.
E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch (10-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.
3.5 CONCRETE PLACEMENT
A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.
B. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, placing, and consolidating concrete.
C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
D. Screed paving surface with a straightedge and strike off.
E. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
3.6 FLOAT FINISHING
A. General: Do not add water to concrete surfaces during finishing operations.
B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
2. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
3.7 CONCRETE PROTECTION AND CURING
A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
B. Comply with ACI 306.1 for cold-weather protection.
C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
E. Curing Methods: Cure concrete by moisture curing.
3.8 PAVING TOLERANCES
A. Comply with tolerances in ACI 117 and as follows:
1. Elevation: 3/4 inch (19 mm).
2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/2 inch (13 mm).
4. Joint Spacing: 3 inches (75 mm).
5. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
6. Joint Width: Plus 1/8 inch (3 mm), no minus.
3.9 REPAIRS AND PROTECTION
A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.
END OF SECTION 321313

Mark	Date	Description

REVISIONS:
1
2
3
4
5
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RYAN J. HERTTER
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 109698
STATE OF TENNESSEE
1/26/15

PROJECT NAME
TANK REPLACEMENT AT HALEY ROAD
SHELBY COUNTY GOVERNMENT
6411 HALEY ROAD
MEMPHIS, TENNESSEE

DRAWING NAME
SPECIFICATIONS

Hertter Mechanical Services
Ryan J. Hertter, P.E., LEED AP
4700 WILD FERN DR
Bartlett, TN 38135
(901) 827-8016

DATE	01/14/15
SCALE	NTS
DRAWN BY	PH
DESIGNED BY	RJH
CHECKED BY	RJH

SHEET NO.
M4.2